SECOND EDITION

Complete Guide to TRX® SUSPENSION TRAINING®

The 100 most effective exercises and 24 ready-to-use programs

JAY DAWES

Complete Guide to TRX® Suspension Training®

Second Edition

Jay Dawes

HUMAN KINETICS

Library of Congress Cataloging-in-Publication Data

Names: Dawes, Jay, author.
Title: Complete guide to TRX Suspension Training / Jay Dawes.
Description: Second edition. | Champaign, IL : Human Kinetics, 2023. | Includes bibliographical references.
Identifiers: LCCN 2022016193 (print) | LCCN 2022016194 (ebook) | ISBN 9781718213869 (paperback) | ISBN 9781718213876 (epub) | ISBN 9781718213883 (pdf)
Subjects: LCSH: Weight training. | Exercise. | Isometric exercise. | BISAC: HEALTH & FITNESS / Exercise / Strength Training | SPORTS & RECREATION / Training
Classification: LCC GV546 .D36 2023 (print) | LCC GV546 (ebook) | DDC 613.7/149--dc23/eng/20220520
LC record available at https://lccn.loc.gov/2022016193
LC ebook record available at https://lccn.loc.gov/2022016194

ISBN: 978-1-7182-1386-9 (print)

their authorship or publication of this work. If medical or other expert assistance is required, the services of a competent professional person should be sought.

The web addresses cited in this text were current as of April 2022, unless otherwise noted.

Senior Acquisitions Editor: Roger W. Earle; **Managing Editor:** Kevin Matz; **Copyeditor:** Lisa Himes; **Permissions Managers:** Laurel Mitchell and Martha Gullo; **Graphic Designer:** Dawn Sills; **Cover Designer:** Keri Evans; **Cover Design Specialist:** Susan Rothermel Allen; **Photographs (cover and interior):** © Human Kinetics; **Photo Asset Manager:** Laura Fitch; **Photo Production Specialist:** Amy M. Rose; **Photo Production Manager:** Jason Allen; **Senior Art Manager:** Kelly Hendren; **Illustrations:** © Human Kinetics; **Printer:** Versa Press

We thank TRX® Training Center in San Francisco, California, and Colvin Recreation Center in Stillwater, Oklahoma, for assistance in providing the locations for the photo shoot for this book.

Printed in the United States of America 10 9 8 7 6 5 4 3 2 1

The paper in this book is certified under a sustainable forestry program.

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E8674

To my wife, April, and my children, Gabrielle, Addison, and Asher. Thank you for allowing me to chase my dreams and for reminding me of what is truly important.

—Jay Dawes

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EXERCISE FINDER

ACKNOWLEDGMENTS

First and foremost I would like to thank my family, friends, and colleagues for their continuous support and encouragement. You inspire and challenge me every day to improve, and I appreciate you all more than words can express. I would also like to thank the team at Human Kinetics, especially Roger Earle, Kevin Matz, Jim Bowling, and Lisa Himes for helping this project get to the finish line. Thank you to TRX® (especially Brynne Elliott and Fraser Quelch) for their support and for endorsing this work. And last but not least, thank you to all the models (Tenae Bascherini, Kevin Defro, Natalie Ferguson, Steve Katai, Rachel Mandeville, Dawei Sun, Miguel Vargas, and Nick Vay) and photographers (Neil Bernstein and Darold Oniwa) for their time, energy, and effort!

INTRODUCTION

Over the last decade Suspension Training® has gone from a novel training method to a common feature in a wide variety of health clubs. It's used by sports teams at every level and also in rehabilitation settings. Utilizing the basic principles of physics, Suspension Training allows the user to adjust the position of their body during specific exercises to alter the amount of their own body mass being lifted. This allows the user to quickly adjust the amount of resistance placed on their body. For these reasons, Suspension Training is an ideal tool for developing and maintaining health and fitness.

Suspension Training originally became popular as a way to develop and maintain fitness among certain populations when traditional fitness equipment was not available. For example, U.S. Navy SEALs used Suspension Training when deployed in austere environments to maintain their fitness and occupational readiness. However, to create such devices, they typically used GI belts and nylon webbing designed to secure equipment to pallets. This concept was eventually commercialized and is now used in a wide variety of populations to improve health, fitness, and performance in both sport and daily life.

Suspension Training also allows exercises to be easily modified to meet the special needs of certain populations. Working with first responders (i.e., police, firefighters), masters athletes, and collegiate athletes, many with multiple chronic injuries, required our training staffs to create modifications that could help them maintain and improve performance without aggravating any preexisting conditions. Introducing Suspension Training into their regular training programs provided a safe, versatile, and effective way for them to attain their goals. We found that individuals who started with a regular routine of Suspension Training experienced increased functional strength, decreased chronic pain, lower injury rates, and better

results when performing Suspension Training in conjunction with traditional resistance training routines.

Suspension Training has a place in practically every type of training program. It can be used to develop mobility, flexibility, balance, coordination, and overall musculoskeletal fitness. Furthermore, based on its ease of portability, Suspension Training can be performed almost anywhere. Consequently, whatever the training needs or goals, Suspension Training is an excellent way to help an individual achieve success and improve the overall results they receive from their training program.

PART I

Science of TRX Suspension Training

Several basic scientific principles support the use of TRX® Suspension Training® as a training modality. Its ability to strengthen the intrinsic stabilizing muscles and joint structures and its adaptability, portability, and versatility make it ideal for maintaining muscular strength and endurance anywhere. Part I presents some of the science behind TRX Suspension Training and explains how to use these principles to guide training and maximize results.

CHAPTER 1

Foundations of Suspension Training

It is generally accepted that performing resistance training on a regular basis can help maintain and improve health, fitness, and quality of life. However, people often encounter obstacles to resistance training, such as time, space, equipment, and cost. Suspension Training® offers a unique approach to resistance training that only requires one portable piece of equipment, and it can be performed almost anywhere. In addition, Suspension Training exercises can be used to address a wide range of fitness needs such as enhancing and maintaining general fitness, improving sport performance, and as a rehabilitation or injury prevention tool. This mode of training can be used as a stand-alone exercise regime, or it can be integrated into a more traditional training program to add variety and prevent staleness and boredom. Additionally, the versatility and portability of Suspension Training systems make these devices very popular among those who are frequent travelers or when access to a traditional gym is limited. Consequently, it is no surprise this form of training has continued to increase in popularity, especially in recent years.

Although Suspension Training is a very straightforward concept, there are some general scientific principles that must be considered when developing a workout using one of these systems. Having a general understanding of these principles will help the reader manipulate different Suspension Training exercises to get the best results from their training. In this chapter, foundational program design concepts that will aid in the

development of fun, challenging, and productive training sessions will also be addressed.

BASIC SCIENTIFIC PRINCIPLES OF SUSPENSION TRAINING

The TRX® Suspension Trainer uses a single-point anchor design that consists of two straps, handles, and foot cradles that are perpendicular to the floor when it is allowed to hang. Think of this as "neutral," in which gravity is the primary force acting on the Suspension Trainer. By grabbing the handles or placing the feet in the foot cradles, and swinging them away from neutral, the user is able to manipulate the amount of their own body mass they are lifting. When done correctly, these adjustments create a training stimulus that can be used to improve numerous areas of physical fitness.

There are a variety of ways to alter an exercise to influence the intensity or difficulty of a Suspension Training program. For the purposes of this text, *intensity* is defined as increasing the load or resistance used for an exercise. *Difficulty* is defined as any variation that may increase the complexity, or stability demands, of a movement or action. In general terms, increasing the intensity of an exercise should result in muscular adaptations such as muscular size, strength, endurance, and power. Increasing the difficulty of the exercise, provided the difficulty level is not too extreme, would have a greater potential impact on physical attributes such as balance, stability, and general body awareness.

In order to change the intensity of an exercise, the user need only step toward or away from the single-point anchor (i.e., pivot point). For example, when performing a TRX low row (pg. 79), the further the individual steps away from neutral, and the higher the center of mass is in relation to the ground, the easier the exercise will be. Conversely, stepping closer to neutral and bringing the center of mass closer to the ground changes the angle of pull and subsequently increases the intensity of this exercise. Due to the location of the pivot point, if the user were to release the handles they would swing back and forth due to the tension on the straps and the pull of gravity. This creates what is known as a force vector. Eventually, due to several factors (e.g., friction at the pivot point, air

resistance, etc.) the Suspension Trainer will start to slow down (i.e., reduced kinetic energy) and eventually return to neutral. Thus, ground contact is necessary to resist the forces that are trying to bring the device back to neutral. The further away from the pivot point, the easier it is to resist the force vector pulling the end of the Suspension Trainer back to neutral. On the contrary, the closer the user is to neutral, the more difficult it will be to resist this force. While the exact application may change based on the exercise, this basic concept provides a framework for altering the demand of a Suspension Training program.

EXERCISE PROGRESSION AND REGRESSION

Several methods for varying the intensity, difficulty, or both, of exercises performed using a single-point anchor Suspension Training system will be discussed in this text. These methods will predominantly focus on ways to manipulate the amount of resistance used during an exercise and the stability demands required.

Altering Stance and Base of Support

Foot position is important for modifying the intensity of exercises performed while standing. The wider the base of support is, the lower the intensity and difficulty of the exercise will be. The narrower the base of support is, the more intense and difficult the exercise will be. Any base of support can be adjusted during the exercise to increase or decrease difficulty.

The following are the seven basic foot positions used in this text:

- *Shoulder-width*—Stand so that the instep of the foot is in line with the armpits (see figure 1.1*a*).
- *Hip-width*—Stand so that the feet and ankles are directly under the hips (see figure 1.1*b*).
- *Feet together*—Stand so that the feet are touching (see figure 1.1*c*).
- *Staggered*—Stand so that the feet are hip-width apart and the toes of one foot are in line with the instep of the other foot (see figure 1.1*d*).
- *Single-leg*—Stand on one foot (see figure 1.1*e*).

a


b


c

d

>continued

FIGURE 1.1 Suspension Training stances: *(a)* shoulder-width, *(b)* hip-width, *(c)* feet together, *(d)* staggered.

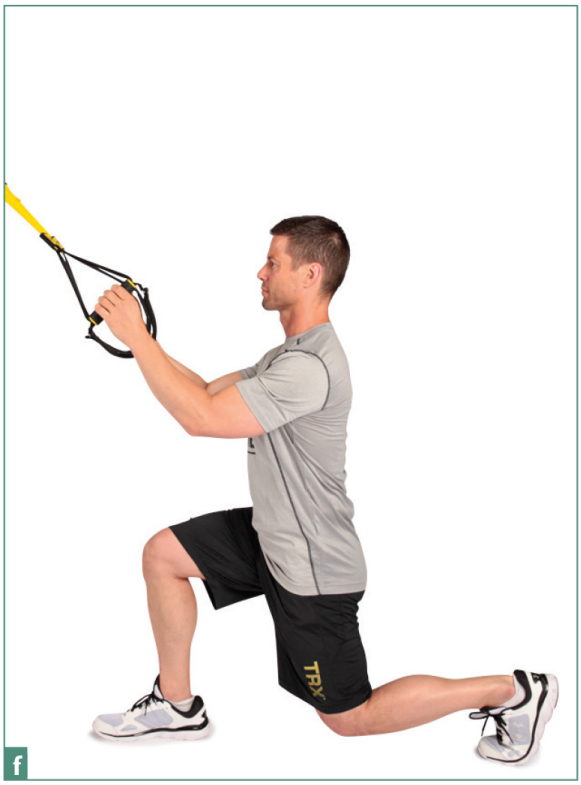


FIGURE 1.1 Suspension Training stances: *(e)* single-leg, *(f)* lunge, *(g)* plank.

- *Lunge*—Stand so that the feet are hip-width apart. Move one leg backward and the other forward. Flex the forward knee until the shin is perpendicular to the foot. Flex the knee of the back leg until it forms a 90-degree angle. The foot of the front leg should be flat on the ground. The heel of the back foot should be raised, and the weight should be supported on the ball of the foot (see figure 1.1*f*).
- *Plank*—Stand so that the upper body, hips, and legs are in line with one another forming a long, ridged lever (see figure 1.1*g*).

Increasing the base of support makes a person more stable, which makes the exercise easier. Narrowing the base of support increases the difficulty by reducing stability in the frontal plane. A single point of contact (one foot, one limb), or rising up on the toes, presents the greatest stability challenges due to a reduction in the amount of surface area in contact with the ground. See figure 1.2 for examples of base of support levels.

FIGURE 1.2 Bases of support: *(a)* easy, *(b)* moderate, *(c)* harder, *(d)* hardest.

Changing the Angle of Pull

Changing the angle of pull also changes the angle of the body in relation to the ground. The further away the body's center of mass is from the ground, or the neutral hanging point of the Suspension Trainer, the lower the exercise intensity will be. The closer the body's center of mass is to the hanging point (the closer it is to the ground), the greater the intensity. See figure 1.3 for examples of angles.

FIGURE 1.3 Angles of pull: *(a)* easy, *(b)* moderate, *(c)* harder.

Pendulum Principle

The pendulum principle is used for exercises that require the feet in the Suspension Trainer and the hands off the ground. The center of mass in relation to the perpendicular gravitational pull determines exercise intensity. Exercises in which the head and feet are on the same side in relation to the anchor point are more difficult than those in which the head and feet are on opposite sides of the anchor point—with some exceptions. See figure 1.4 for pendulums.

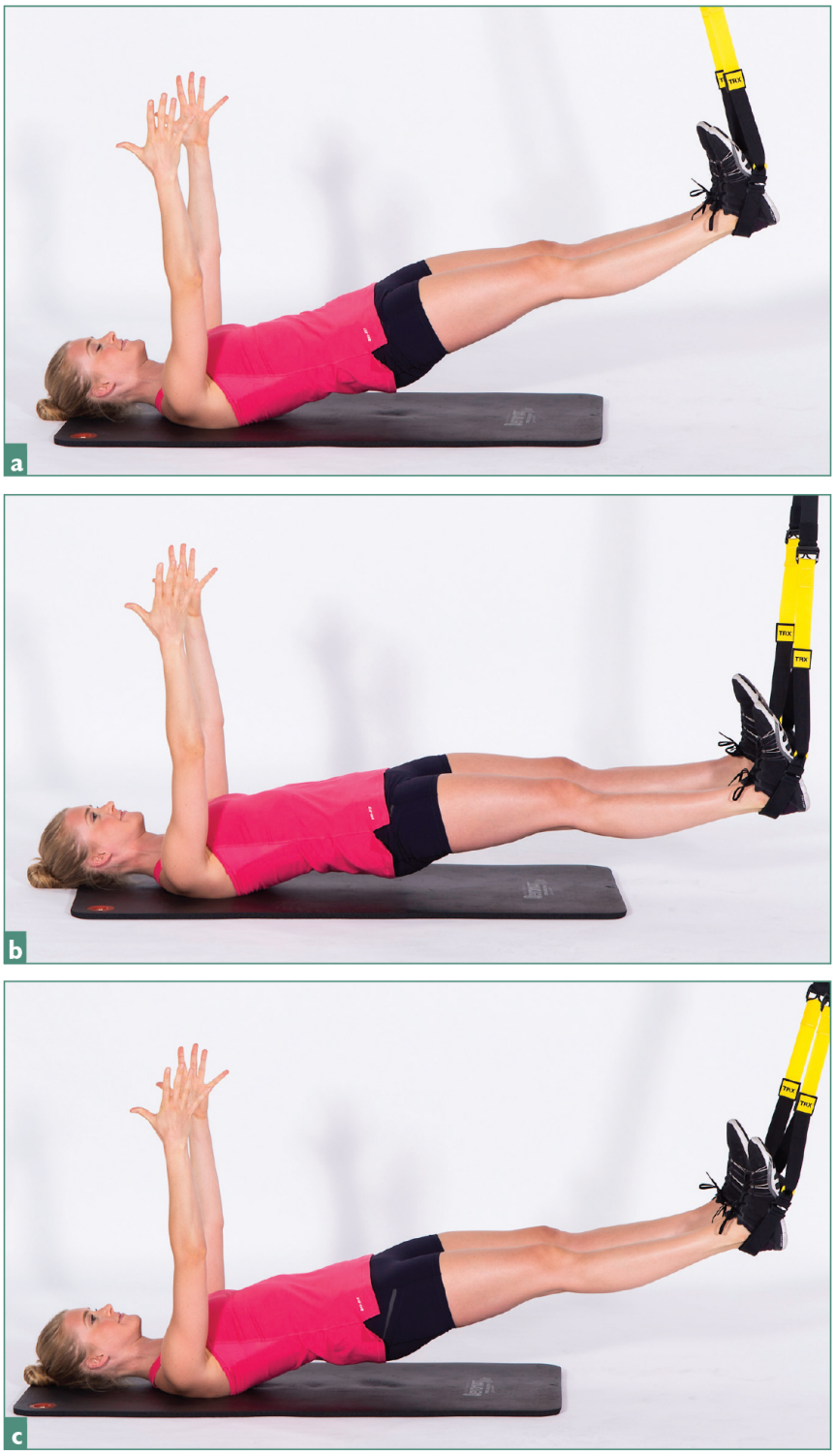


FIGURE 1.4 Pendulums: *(a)* easy, *(b)* moderate, *(c)* harder.

Contact With the Handles

Using a single handle can increase the difficulty of some exercises by increasing the amount of neuromuscular control and stability needed to maintain body position. When performing exercises unilaterally, on the side of the body with the free arm or leg, gravity tends to pull the body into rotation. Resisting the rotation is an excellent way to build trunk stability and reduce injury potential. Furthermore, unilateral type exercises (i.e., one hand or one foot in the straps) create off-center loading and require greater joint stabilization than traditional bilateral exercises, in which the loads moved are more evenly distributed. Used appropriately, this can provide a great alternative method of developing joint strength and stability. Additionally, when exercises are performed unilaterally, the amount of resistance to a single limb is increased and, in some cases, doubled.

For single-handle exercises to be safe, the handles must remain together during the exercise. This can be accomplished by grasping one handle in each hand (see figure 1.5*a*). Next, pass the handle in the right hand through the left-handle triangle (see figure 1.5*b*). Now take the handle in the right hand and pass it through the left-handle triangle (see figure 1.5*c*). Firmly pull down, cinching the handles together (see figure 1.5*d*). Test the security prior to performing the exercise.

FIGURE 1.5 Single-handle setup.

FIGURE 1.6 Double-handle setup.

Exercises using one limb, either an arm or a leg, require the double-handle setup for most individuals (see figure 1.6). The use of a single handle when a single arm or leg is in contact with the ground requires high levels of coordination, balance, and strength. Only experienced individuals with high levels of strength should attempt such progressions.

Suspension Training can be a very effective way to improve health, fitness, and performance. An understanding of the basic scientific principles behind Suspension Training will help in the creation, progression, and regression of a variety of exercises regardless of training level. The chapters that follow describe how to use these principles to develop comprehensive training programs and workouts.

CHAPTER 2

Benefits of Suspension Training

Suspension Training systems have a wide variety of benefits and can be used both as stand-alone training devices, and in conjunction with other more traditional training equipment. The value of this training tool is largely based on the specific training goals of the user and how they are able to manipulate the resistance during these exercises to elicit a specific adaptation response. The following section highlights some of the potential benefits of Suspension Training as a tool for improving health, fitness, and performance.

SUSPENSION TRAINING AS A METHOD OF IMPROVING FITNESS

Suspension Training has been shown to improve a variety of health, fitness, and performance measures in recreationally active populations. Janot and colleagues (2013) reported that performing Suspension Training twice per week for seven weeks resulted in significant improvements in flexibility, balance, core endurance, and lower-body strength among younger adults (19 to 25 years). In the same study, researchers also discovered that middle-aged adults (44 to 64 years) using Suspension Training experienced significant improvements in both core endurance and lower-body strength. Similarly, Smith et al. (2016) reported significant ($p < 0.05$) improvements in waist circumference, blood pressure, body fat percentage, and muscular

fitness among males and females after eight weeks of performing a Suspension Training session. These findings suggest that numerous health and fitness benefits can be developed through the use of Suspension Training. In the following sections, specific physical attributes that can be developed using this modality will be discussed in greater detail.

Improving Muscular Fitness

One of the major benefits of Suspension Training is the ability to apply progressive resistance to the body, which is the key to a successful resistance training program. Suspension Training can be used to improve a wide variety of muscular attributes including endurance, size, strength, and power. However, the muscle attribute best developed during Suspension Training may depend on an individual's initial strength level. Suspension Training may yield significant increases in overall muscular endurance and strength, and muscle size for individuals with minimal resistance training experience.

As a general rule of thumb, those who can perform no more than 10 repetitions of a given exercise should focus on muscle size and strength rather than endurance. In contrast, those who can perform significantly more than 10 repetitions of a particular Suspension Training exercise would likely benefit the most by using this device to develop muscular endurance. However, many Suspension Training exercises can be manipulated to increase the overall training load even for advanced lifters. For example, adding external resistance (such as a weighted vest), manipulating body position in relation to the anchor point, or using single-limb versions of certain exercises can significantly affect training load and shift the physical demands from muscular endurance to strength.

Suspension Training can also be used as an adjunct to training stronger individuals. Exercises that focus on attributes such as mobility and flexibility can be incorporated into a more traditional training program as a form of active recovery between sets: improving time efficiency and training density. Suspension Training can also be used as a method to increase training volume during a hypertrophy (i.e., muscle size) cycle or as a deloading session to enhance muscle recovery. Suspension Training may also be beneficial in reducing the amount of strength lost during periods in which access to a gym or more traditional forms of equipment are difficult

(e.g., travel, facility closures, etc.). During these times Suspension Training may be used to help preserve strength or shift the training emphasis to working on complementary or weaker muscle groups, which may be advantageous when returning to normal training.

Metabolic Conditioning

Suspension Training can be used as a form of total body conditioning to develop the aerobic and anaerobic energy systems. Research by Dudgeon et al. (2015) found that a 60-minute whole body interval-based Suspension Training workout resulted in average heart rates at 69 ± 2 percent of estimated max and burned approximately 340.9 ± 13.6 kcal (95.3 ± 0.4 kcal/min). Similarly, Snarr and colleagues (2014) reported that a high-intensity interval-based workout consisting of nine body weight–based Suspension Training exercises resulted in participants achieving average heart rates of approximately 83 ± 4.2 percent of estimated max. Furthermore, these authors reported that the estimated caloric expenditure of this session was 96.98 ± 19.49 total kcal (10.8 ±2.2 kcal/min). These findings suggest that Suspension Training is an effective method of improving metabolic fitness and body composition. Additionally, this style of training may work well for individuals that dislike performing traditional steady-state cardiovascular training.

Developing Movement Efficiency

One of the major benefits of using Suspension Training is the ability to develop movement efficiency. Whether in sport or daily life, individuals must be able to produce, reduce, and dynamically stabilize forces to produce efficient and effective movements (see figure 2.1). This requires a combination of both stability (i.e., resistance to movement), mobility (i.e., the ability to move), and motor control (i.e., coordination). Producing efficient movements at the joints requires a base of stability (i.e., proximal stability) that allows the arms and legs to move fluidly through their intended ranges of motion (i.e., distal mobility). Consequently, inadequate mobility or stability may compromise movement and motor control. This is one of the primary reasons for first emphasizing proximal stability and motor control of the trunk in the training program. Doing so optimizes joint mobility and has a dramatic effect on functional abilities. Suspension

Training is an excellent way to help develop each of these attributes simultaneously. Based on the setup and execution of many Suspension Training exercises, the demand for trunk stability and control can be increased beyond that of many traditional exercises.

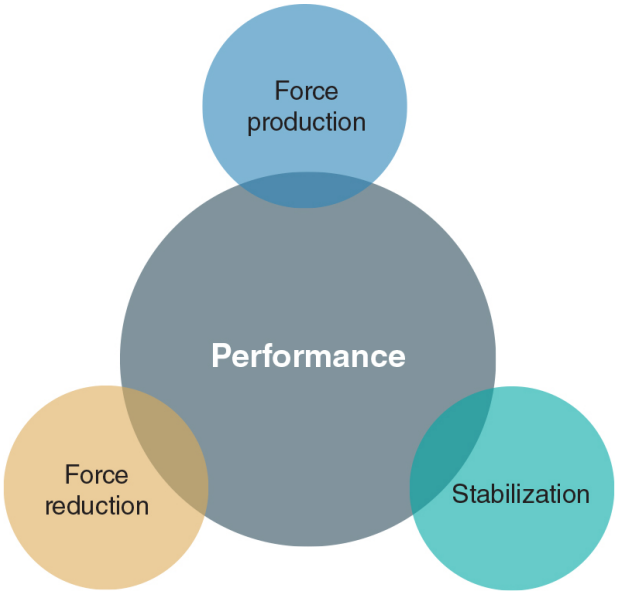


FIGURE 2.1 Essential elements of performance.

INJURY REDUCTION AND REHABILITATION

Previous injuries, habitual movement patterns, and repetitive stress may lead to a variety of anatomical constraints. These constraints may decrease the ability to produce efficient movement by creating compensatory movement patterns. When these patterns are performed chronically, neuromuscular inefficiency and tissue breakdown are common. This may lead to pain or increased injury risk.

Core stability, or the effective recruitment of the muscles surrounding the trunk and pelvis, is essential to produce, reduce, stabilize, and transfer forces through the spine, as well as to control the muscles that surround the lower back and pelvis (Mok et al. 2015). Thus, the ability to maintain core stability can have a profound effect on injury prevention. Given that core stability is inherent in practically all Suspension Training exercises, this modality can be easily integrated into a comprehensive injury prevention program.

When using a Suspension Trainer, one or both limbs of either the upper or lower body are supported in handles or foot cradles. At the other end of the Suspension Trainer is an anchor point. The design of this device increases the demands on the user to control their body weight in multiple planes of movement and at multiple joints, while adding varying and progressive degrees of instability. Thus, the user must often recruit more muscles to remain stable while performing a movement. This improves what is referred to as top-down stability. Other devices, such as gymnastics rings, also develop top-down stability. However, unlike rings, most Suspension Trainers use a single anchor point with a limited-slip locking loop. This allows the user to add progressive amounts of instability to the training programs, which may improve joint stability and body awareness and increase the muscular activity of the core.

EASE AND ADJUSTABILITY

The configuration of the Suspension Trainer allows the user to adjust the working angle to manipulate body angle and either increase or decrease the training load for each exercise. Melrose and Dawes (2015) conducted a study to evaluate the percentages of body mass people using Suspension Training were required to move with their torsos at angles of approximately 30, 45, 60, and 75 degrees and with their feet directly under the anchor point. Not surprisingly, they found that as people leaned back and their torsos became less vertical, resistance increased (37.44 ± 1.45 percent of body mass at 30 degrees, 52.88 ± 0.59 percent at 45 degrees, 68.08 ± 1.95 percent at 60 degrees, and 79.38 ± 2.14 percent at 75 degrees). Making these small adjustments in body position is significantly easier than changing weights between exercises, which is beneficial in a group training session in which multiple users of varying fitness levels are using the same equipment. In addition, manipulating the base of support (e.g., lifting one leg) can introduce additional balance and stabilization challenges to meet the task-specific demands and current physiological abilities of individual exercisers.

AFFORDABILITY AND PORTABILITY

Some major benefits of Suspension Training are its ability to perform a wide variety of exercises in a small space, and the device's portability. These features make it ideal for home gyms and for those who travel frequently. Furthermore, Suspension Training equipment is significantly less expensive than gym memberships.

Suspension Training is unique in its ability to strengthen the intrinsic stabilizing muscles and joint structures. Its benefits include adaptability, portability, and versatility, making it ideal for maintaining muscular strength and endurance anywhere. Integrating Suspension Training into a workout program may also develop accessory muscles, assisting in overall strength development.

Using Suspension Training in a rehabilitation program may also develop the body's core region, lending support to many other structures. Moreover, incorporating it into a daily program requires minimal instruction and supervision by professional staff.

CHAPTER 3

Setup, Safety, and Success

Setting up the Suspension Trainer properly is essential to ensure exercises are performed in a safe and effective manner. While Suspension Training is not inherently dangerous, failure to properly set up the system can lead to serious injury. In this section, best practices for setting up your Suspension Training system to optimize performance and reduce injury risk will be discussed. Furthermore, while Suspension Training only requires your body mass to provide a comprehensive workout depending on the exercise performed, it can be very physically challenging. Therefore, as with any exercise program, consultation with a health care provider is recommended, especially for those who have previous muscle or joint injuries that can be affected by exercise.

SUSPENSION TRAINER ANATOMY

A general understanding of the anatomy of the Suspension Trainer is helpful. Figure 3.1 identifies the parts.

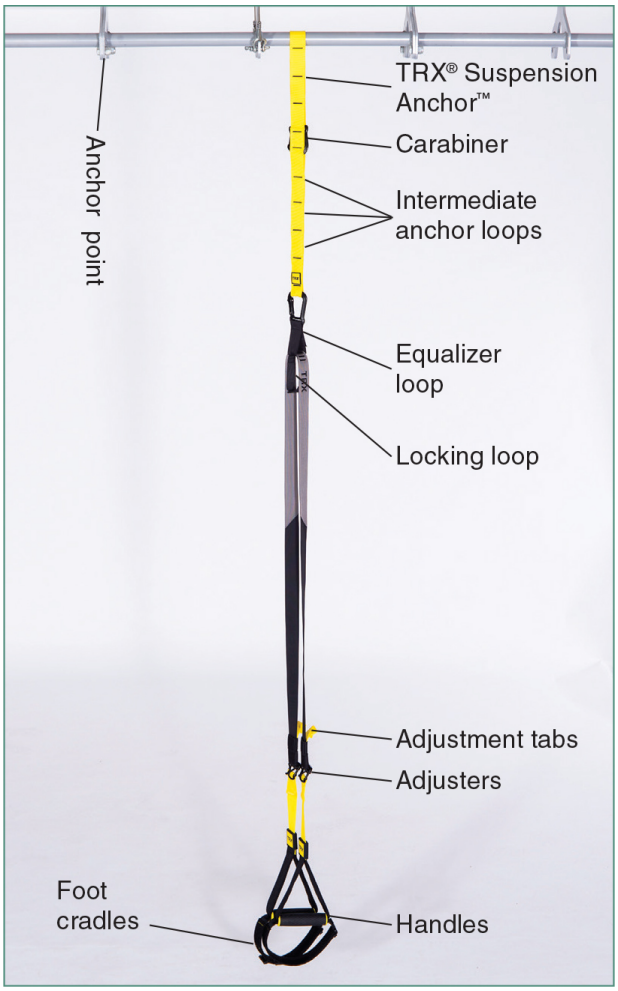


FIGURE 3.1 Parts of a Suspension Trainer.

ANCHORING THE SUSPENSION TRAINING SYSTEM

The first step to ensuring success is making certain the Suspension Training system is securely anchored, which is critical for safety. Anchoring the Suspension Trainer requires a sturdy structure that can support the user's weight, such as a beam, or steel bar, similar to those found on a squat rack. A door can also be used as long as the Suspension Trainer has a door anchor attachment.

Hang the Suspension Trainer by wrapping the suspension anchor around the structure (see figure 3.2*a*); then, secure it by fastening the carabiner to the appropriate loop (see figure 3.2*b*) so that it hangs straight (see figure 3.2*c*). Be sure to test the weight before using it by pulling firmly on the straps and then gradually shifting weight to the Suspension Trainer.

If using a door, be sure to clip the strap into the loop of the door anchor (see figure 3.3*a*). Place the door anchor over the top of the door (see figure 3.3*b*); then close the door securely (see figure 3.3*c*). Note that the door should open away from the user, allowing the doorjamb to provide extra support during the exercises.

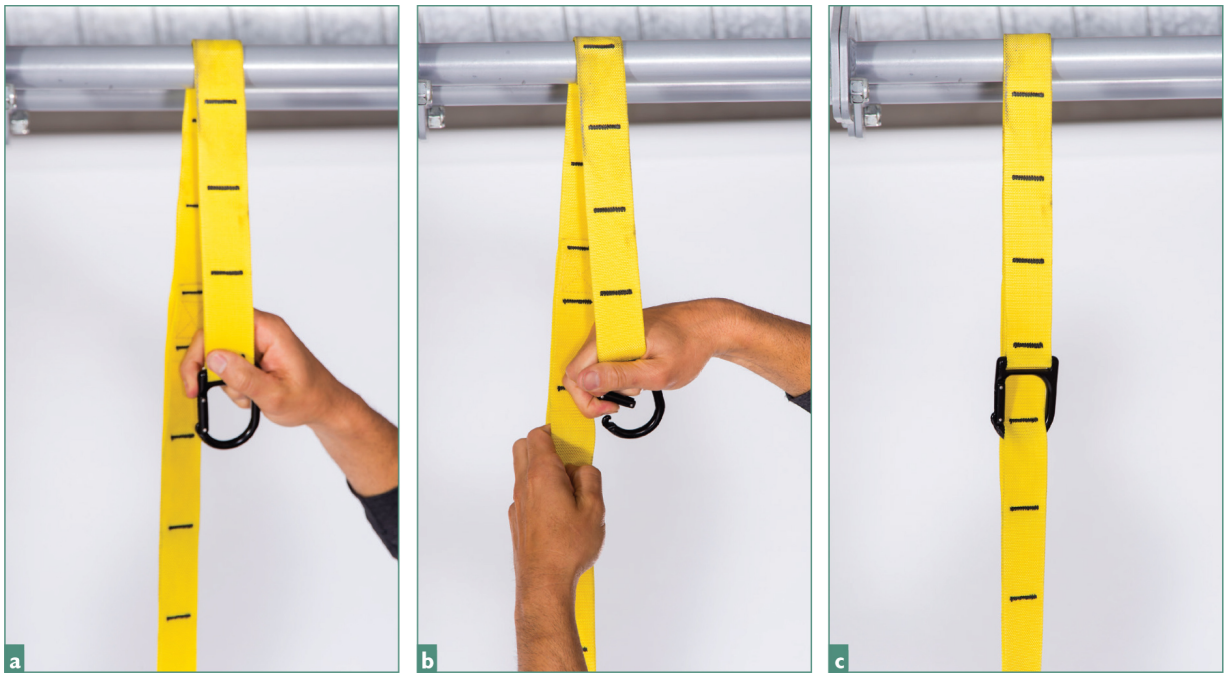


FIGURE 3.2 Anchoring a Suspension Trainer around a beam. *Note*: It is recommended to wrap the anchor around the beam at the anchor point to provide a tight cinch and prevent movement.

FIGURE 3.3 Anchoring a Suspension Trainer around a door.

ADJUSTING THE SUSPENSION TRAINER LENGTH

Adjusting the Suspension Trainer to the appropriate length before each exercise is important to ensure an appropriate training load. The following are typical lengths and positions:

- *Fully shortened*—Adjust the tabs so that they are at the highest point; that is, closest to the anchor (see figure 3.4*a*). This position is primarily used for exercises involving the back, such as row exercises.
- *Mid-length*—Adjust the tabs so that they are approximately at the midpoint of the straps (see figure 3.4*b*). This position is primarily used for standing exercises such as the biceps and triceps press.
- *Mid-calf*—Adjust the tabs so that the foot cradles are even with the middle of the user's shin or calf, which is approximately 12 inches (30 cm) off the ground (see figure 3.4*c*). This position is primarily used for exercises involving prone and plank positions.
- *Fully lengthened*—Adjust the tabs so that the bottom of the handles are approximately three inches (8 cm) off the ground (see figure 3.4*d*). This position is primarily used for all chest press exercises.

GRIPPING THE SUSPENSION TRAINER

There are several ways to grasp the handles during Suspension Training exercises. Some require a specific grip, whereas others use a variety of grips to increase difficulty. The following are the three basic grips:

- *Supinated*—Palms facing up. This grip places a greater demand on the biceps and wrist flexors.
- *Pronated*—Palms facing down. This grip places a greater demand on the rhomboids and wrist extensors.
- *Neutral*—Thumbs facing up or palms facing inward. This grip reduces stress to the shoulder joint and can be used as a modification in any exercise.

PRACTICING SUSPENSION TRAINING SAFELY

When using a Suspension Trainer, check and recheck the anchor system prior to use to ensure that it can support the user's body weight. Generally, the issue is not related to the system itself (it is designed to support weight); rather, the issue is often related to the anchor. For instance, when anchoring the Suspension Trainer to a door, a heavy exterior door is much safer than a hollow interior door. Use a dead bolt when anchoring to an external door to reduce the risk of the door opening during an exercise. Also, if using the Suspension Trainer in the single-handle configuration, check and recheck the handles to be sure they are secured together prior to use.

The location around the Suspension Trainer should be clear of clutter and debris, and the ground should be level and dry. If using the system outside, clear the training area of any loose debris, such as small rocks, sticks, or gravel. Do not use electrical poles as anchor attachments, and make certain there are no electrical wires near or around the training area.

The following are other important guidelines to follow to ensure safe training:

- Never stand in the handles or foot cradles.
- Do not use the Suspension Trainer as a swing.
- Wipe off any sweat on the ground, handles, and foot cradles to avoid slipping.


a


b


c


d

FIGURE 3.4 Suspension Trainer strap lengths: *(a)* fully shortened, *(b)* mid-length, *(c)* mid-calf, *(d)* fully lengthened.

- Periodically spray the straps, handles, and foot cradles with an antibacterial spray to reduce the risk of transmitting illnesses or disease (such as MRSA), especially if used in a group setting.
- Be cautious about using hand lotion prior to training because it can increase the risk of slipping off the handles.
- Perform all exercises on resilient flooring with a nonskid surface to reduce the risk of slips, falls, and joint stress.
- Make sure the Suspension Trainer is not rubbing against any skin during use to avoid skin abrasions.
- Wear lightweight and nonrestrictive clothing designed for exercise; other types may restrict or hinder movement.
- Perform exercises in an open area free of debris, clutter, sharp objects, or furniture.
- Avoid exercises that may aggravate current or previous injuries.
- Be familiar with, practice, and master basic exercises prior to performing more advanced variations.
- Perform Suspension Training exercises with caution if you have major orthopedic limitations or are morbidly obese. Do not perform exercise variations that require greater balance challenges (e.g., single-leg variations), at least in the initial stages of training, if you have these conditions.
- Perform a 5- to 10-minute general warm-up prior to training.

When setting up and using a Suspension Trainer, safety is paramount. Following the general guidelines in this chapter will help ensure safe and effective Suspension Training. However, it is the user's responsibility to be aware of the surroundings and make any appropriate adjustments to maximize safety.

CHAPTER 4

Physical Testing and Assessment

Periodic physical assessments help determine whether training adjustments are needed and when to increase exercise intensity. This chapter addresses some of the foundational principles related to physical testing and assessment and provides suggestions for selecting the best tests to use for measuring progress.

CONSIDERATIONS BEFORE TESTING

Before undertaking any type of physical assessment, people should be familiar with the exercises and tests they will perform in the assessment. Moreover, the assessment itself must be both valid and reliable in order to provide accurate and useful information. These issues are addressed in greater detail in the following section.

Preparedness

Practicing the exercises and tests prior to testing reduces the likelihood of using poor technique during the actual assessment. A 5- to 10-minute general warm-up prior to testing is also recommended and should include movements that will progressively increase your heart rate, respiration rate, perspiration rate, and muscle temperature. Walking or jogging for three to five minutes followed by approximately five minutes of lightweight calisthenic exercises or exercises performed on the Suspension Trainer would be an appropriate warm-up. Make sure that these selected exercises

and their intensity do not negatively affect the testing process. If too much fatigue is accumulated during this portion of the testing process, it may have a negative effect when performing the actual test.

Validity

Validity refers to the ability of a test to accurately measure a specific outcome or attribute. For example, for determining muscular endurance of the trunk, a test that measures endurance in this area, such as the partial curl-up test, would be ideal. In contrast, to measure improvements in mobility and flexibility, a test such as the sit-and-reach test would be most appropriate. Specific tests to measure a variety of physical fitness characteristics are featured in this chapter.

Reliability

Reliability refers to the consistency of the results. The following are guidelines for improving the reliability of an assessment:

- Perform all tests indoors in a consistent environment (i.e., temperature, humidity, training surface) to reduce variability.
- If using the Suspension Trainer, adjust the handles and foot cradles to the same length during every test, and place the feet at the same distance from the anchor point. Based on the nature of this training device, these small alterations can create significant changes in the testing load. Failure to be consistent with the setup will produce inaccurate comparisons.
- Consider body mass. Significant increases or decreases in weight may alter the results because more or less weight is being moved. This is a particularly misleading factor for those who accrue a large amount of muscle mass. Although they may be significantly stronger, they still must move more mass than in their original test. Therefore, the overall amount of weight moved is greater. This may result in a net zero gain in the number of repetitions performed or in the amount of time holding an isometric position. In reality, improvement has occurred because they are moving or stabilizing a higher load.
- Do not perform tests when significantly fatigued or when experiencing muscle soreness; these conditions can affect results. As

a general rule, perform testing 48 to 72 hours after the last exercise session to reduce the effects of soreness and fatigue.

- Tests should be performed in a specific sequence to ensure the effect of fatigue on test performance is minimized. Perform tests in the following order: non-fatiguing tests (i.e., anthropometric and single effort power tests); mobility, stability, and flexibility tests; muscular endurance assessments; and measures of aerobic fitness.
- Reassess every six to eight weeks.
- Always give your best effort.

TESTING SELECTION

This section presents basic testing options for gauging progress and the effectiveness of a training plan. These tests provide a good general assessment of current fitness level; however, if you experience pain during any of these movements you should immediately stop and seek medical attention prior to starting or continuing a training program. It is not necessary to perform all of the tests in this section; rather you can select tests that are most appropriate for measuring progress for specific training goals.

Anthropometric Measurements

Anthropometric measurements are frequently used as a measure of proportionality and general health, and include height, weight, and circumference measurements to name just a few.

Circumference Measurements

PURPOSE

To measure anthropometric changes in specific body regions.

EQUIPMENT

Measuring tape.

DESCRIPTION

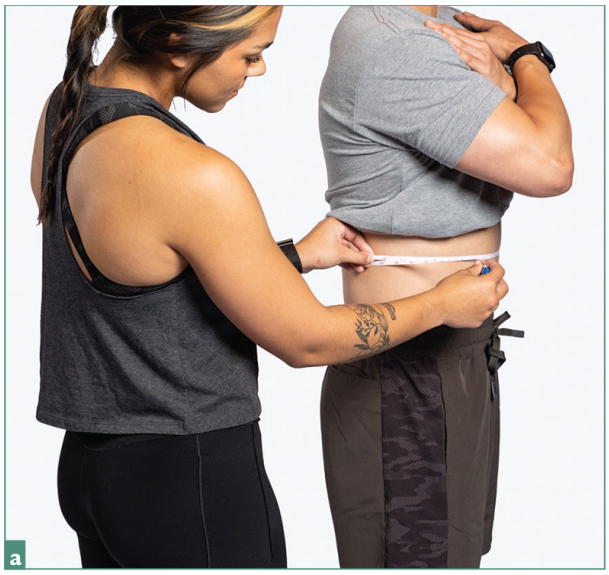
Begin by removing any bulky outer garments and stand with the arms comfortably out to the sides of the body. Using a mirror, or with the assistance of a partner, wrap the measuring tape around the muscle region to be measured. Make certain the tapeline is level and held snug, but it should not be so tight that it creates any skin indentions. Specific procedures for each body measurement are listed here.

Waist—Using the tapeline, measure the narrowest part of the torso between the navel and ribs (see figure *a*). Record this measurement to the nearest 1/4 inch (0.6 cm).

Hips—Begin by placing the feet together. Wrap the tapeline horizontally around the hips at the widest part of the buttocks (see figure *b*). Record this measurement to the nearest 1/4 inch (0.6 cm).

Upper-arm—Raise the arm so that the upper arm is parallel to the ground and the elbow is at a right angle. Contract the biceps muscle, visually locate the largest circumference, and take a vertical circumference measurement of this area (see figure *c*). Record this measurement to the nearest 1/4 inch (0.6 cm). Repeat this process on the other arm.

Thigh— From a seated position measure midway between the hip crease and kneecap (see figure *d*) and take a horizontal measurement of this area (see figure *e*). Record this measurement to the nearest 1/4 inch (0.6 cm).


a


b


TRX
c


d


e

Waist to Hip Ratio (WHR)

PURPOSE

To assess general health status.

EQUIPMENT

Calculator.

DESCRIPTION

Using the procedures previously described, collect the circumference measurements taken for the waist and hips, and then divide the waist measurement by the hip's measurement (WHR = waist girth/hip girth). For males, a healthy WHR is ≤ 0.90, and for females, a healthy WHR is ≤ .85. A WHR above these values indicates an individual is at increased health risk.

Balance Testing

Balance, or the ability to maintain equilibrium over a dynamic or static base of support, is not only important in most athletic endeavors, but also essential for reducing injury risk. The Stork Stand Test can be performed practically anywhere with little equipment.

Stork Stand Test

PURPOSE

To measure balance and stability on a single leg.

EQUIPMENT

Stopwatch.

DESCRIPTION

Stand on one foot with the opposite foot against the inside of the supporting knee and place both hands on the hips. When ready, raise the heel of the foot off the floor and attempt to maintain balance for as long as possible (see figure). Record the amount of time in seconds that balance was maintained. Repeat this process on the opposite leg.


TRX

Flexibility and Mobility Testing

Flexibility (i.e., tissue extensibility) and mobility (i.e., joint range of motion) are important factors when performing activities of daily living, sports, and other recreational activities. A certain amount of flexibility and mobility is beneficial in reducing injury risk. The following are a few examples of tests that assess these qualities in specific joints. It is important to remember that both flexibility and mobility are joint specific, thus other tests that assess these qualities at different joints may be useful.

Apley Scratch Test

PURPOSE

To assess shoulder mobility and range of motion.

EQUIPMENT

None.

DESCRIPTION

Raise one arm overhead, then reach behind the head and attempt to touch the top of the scapula (see figure *a*). Using the same hand, reach behind the back and attempt to touch the back edge of the opposite scapula (see figure *b*). Repeat this process using the opposite arm. This is a simple pass or fail test. Each of these four movements should be evaluated separately. If any pain is experienced during these movements, it is recommended that a physician be consulted.


a
b

Sit and Reach Test

PURPOSE

To measure hamstring and lower back flexibility.

EQUIPMENT

Yardstick and adhesive tape.

DESCRIPTION

Place a yardstick on the floor and tape it down at the 15-inch (38 cm) mark to create two right angles. Sit with the yardstick between the legs, and extend the legs so that the ankles are flexed and the toes are pointed toward the ceiling; the feet are approximately 10 to 12 inches (25 to 30 cm) apart. Reach forward as far as possible along the yardstick while keeping the fingertips aligned and overlapped (see figure). The score for this test is the furthest point reached.

Muscular Power Testing

Power is the ability to express force rapidly. It is an essential element in most sports, and important in both daily life and recreational activities. The Vertical Jump Test is one of the most common tests used to assess lower-body power.

Vertical Jump Test

PURPOSE

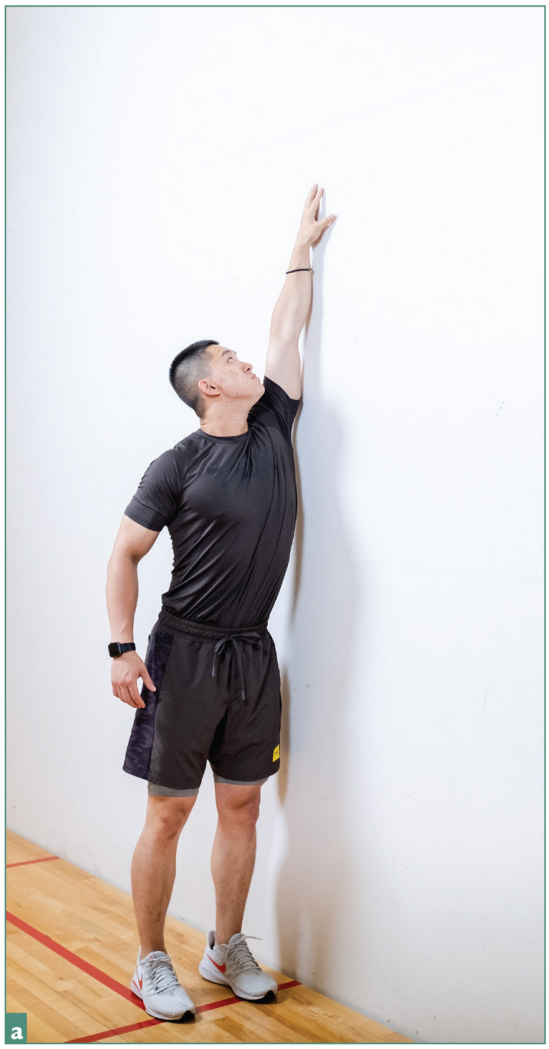
To assess lower-body power.

EQUIPMENT

Chalk and a yardstick.

DESCRIPTION

Chalk the tips of the index and middle finger, then while standing next to a wall, reach as high as possible and make a mark (see figure *a*). While keeping the arm stretched overhead quickly flex the ankles, knees, and hips, then jump as high as possible and make a second chalk mark on the wall (see figure *b*). Measure the distance between the two points to the nearest 1/2 inch (1.3 cm).


a


b

Muscular Fitness Testing

The following tests can be used to measure muscular endurance and strength. The fitness level of the individual performing the test establishes which attribute is measured. If an individual performs fewer than 12 repetitions on a test, it is primarily a measure of general muscular fitness or strength, whereas if the individual completes more than 12 repetitions, the test is mainly a measure of muscular endurance.

Two-Minute Push-Up Test

PURPOSE

To assess upper-body muscular endurance of the chest, shoulders, and triceps.

EQUIPMENT

Stopwatch.

DESCRIPTION

Begin by assuming a plank position with the arms extended, trunk braced, and hands placed on the floor approximately shoulder-width apart and directly aligned with the sternum (see figure *a*). Lower the body toward the floor by allowing the arms to flex until the upper arm is slightly less than parallel to the ground (see figure *b*). A yoga block or small water bottle can be placed under the chest to gauge the appropriate depth for each repetition. Maintain a rigid trunk, extend the elbows, and push the body back to the starting position. Perform as many push-ups as possible in two minutes. Individuals may rest in the starting position between repetitions. Only repetitions performed with proper form should be counted toward the total score. The intensity may be reduced by performing this test with the knees on the ground (see figure *c*). In order to shift the focus from muscular endurance to muscular strength, a weighted vest may be used.


a
b
c

Partial Curl-Up Test

PURPOSE

To assess muscular endurance of the abdominal muscles.

EQUIPMENT

None.

DESCRIPTION

Begin by lying on your back, with the hips and knees flexed and both feet flat on the ground. Cross the arms and place each hand on the opposite shoulder (see figure *a*). While keeping the feet and hips in contact with the ground, flex the trunk until the head, neck, and shoulder blades are off the ground (see figure *b*). Return to the starting position. Perform as many repetitions as possible and record the total number.


a


b

Single-Leg Sit-to-Stand Test

PURPOSE

To assess lower body muscular endurance.

EQUIPMENT

A chair or bench that will allow the knees to flex at a 90-degree angle when seated.

DESCRIPTION

Sit on the chair or bench and lift one foot off the ground. Place the arms across the chest (see figure *a*) then stand using only the flexed leg (see figure *b*). Perform as many repetitions as possible and record the total number, then repeat on the opposite leg.


a


b

Cardiorespiratory Endurance Testing

Cardiorespiratory endurance can be defined as the ability of the heart, lungs, and circulatory system to provide oxygen to the body and remove waste products created during sustained physical activity. Cardiorespiratory endurance is linked to a number of health benefits including a reduction in the likelihood of premature sickness and death. The Twelve-Minute Run Test is a simple method to assess this quality.

Twelve-Minute Run Test

PURPOSE

To assess the ability of the heart, lungs, and circulatory system to provide energy to the body during sustained physical activity.

EQUIPMENT

A marked 400-meter track or treadmill.

DESCRIPTION

Run for 12 minutes and attempt to cover as much distance as possible. The distance covered should be measured and recorded against future results. The greater the distance traveled, the higher an individual’s fitness level.

SUGGESTED TESTING BATTERY USING THE TRX SUSPENSION TRAINER®

While any of the exercises in this book can be used as a formal or formative assessment for improvements in fitness and performance, the following test battery using the Suspension Trainer provides a balanced assessment of trunk, upper-body, and lower-body endurance.

TRX Forearm Plank

Adjust the straps to mid-calf length. Lie on the ground facing away from the anchor point. Place one foot in each foot cradle. From the facedown position, lift the hips and torso until the elbows are directly under the shoulders and the upper arms are perpendicular to the ground using one continuous movement (see figure). Measure this test by tracking the time spent holding the plank position with perfect form and technique. As soon as technique breaks, the test should be terminated. This should be the first test performed in the series. If unable to perform this exercise, substitute the standing plank (see page 135).

TRX Push-Up

Adjust the straps to mid-calf length. Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Place the hands on the ground approximately shoulder-width apart. Set the body in a straight line, or plank position. While bracing the trunk and keeping the arms straight, pull the shoulder blades down and together (see figure *a*). Flex the elbows to lower the body to the ground, keeping the torso flat and rigid, until reaching a 90-degree angle at the elbows (see figure *b*). Push the body back up to the starting position. This test is measured by counting the number of repetitions performed within a set period of time (e.g., one or two minutes), or by counting the number of repetitions performed with good technique or until volitional fatigue. During the test, one may rest in the starting position. If the individual is unable to maintain a proper plank position (i.e., hips drop or rise), the test should be terminated and the number of repetitions to this point should be recorded.


TRX
a


TRX
b

TRX Low Row

Fully shorten the straps. Stand facing the anchor point and grab the handles (one in each hand) using a neutral grip. While keeping the arms completely straight, position your feet directly underneath the anchor point and lean back until the torso is at approximately a 45-degree angle to the ground (see figure *a*). Pull the shoulder blades together and downward. Pull the body toward the anchor point by flexing the arms and extending the shoulders (see figure *b*). Slowly extend the arms and allow the shoulders to flex to return to the starting position. This test is measured by counting the number of repetitions performed within a set period of time (e.g., one or two minutes), or by counting the number of repetitions performed with good technique or until volitional fatigue. During the test, one may rest in the starting position. If the individual is unable to maintain a proper plank position (i.e., hips drop or rise), the test should be terminated and the number of repetitions to this point should be recorded.


a
b

TRX Lunge

Adjust the straps to mid-calf length. Stand facing away from the anchor point with the hands on the hips, and place one foot in the foot cradles (see figure *a*). The other foot should be firmly planted on the ground with weight evenly distributed between the big toe, little toe, and heel. While maintaining a rigid torso, allow the lead leg, ankle, knee, and hip to flex until the top of the thigh is parallel to the ground (see figure *b*). Extend the lead leg and bring the back foot forward until returning to the starting position. This test is measured by counting the number of repetitions performed within a set period of time (e.g., one or two minutes), or by counting the number of repetitions performed with good technique or until volitional fatigue. During the test, one may rest in the starting position. If the individual is unable to maintain balance, the test should be terminated and the number of repetitions to this point should be recorded. When completed, place the opposite foot in the foot cradles and then repeat using the opposite leg.


a
b

HOW TO USE THE RESULTS

The information gathered from testing can be used in several ways. This section explains how to use this information to determine the efficacy of the training program and how to adjust it to continue making progress.

Tracking Progress

Figure 4.1 is a blank Suspension Training assessment tracking sheet for measuring fitness progress.

	Date: _____	Date: _____	Date: _____
TRX forearm plank			
TRX push-up			
TRX low row			
TRX lunge (left foot)			
TRX lunge (right foot)			

FIGURE 4.1 Suspension Training assessment tracking sheet.
From J. Dawes, *Complete Guide to TRX® Suspension Training®,* 2nd ed. (Champaign, IL: Human Kinetics, 2023).

Measuring Change

One way to gauge fitness progress is to simply look at the amount, or percentage, of change between testing dates. To calculate the amount of change, subtract the value of the previous test from the value of the current test. Look at the completed tracking sheet in figure 4.2. If the athlete was able to perform 20 push-ups during the first test, and 12 weeks later was able to perform 30 push-ups, this would be a net change of 10 push-ups. The percentage of change could also be calculated as follows:

1. Subtract the old value from the new value:

30 push-ups (current test) – 20 push-ups (previous test) = 10 push-ups

2. Divide the amount of change by the old value:

10 push-ups (amount of change) / 20 push-ups (previous test) = 0.50

3. Convert to a percentage by multiplying the decimal number by 100:

0.50 × 100 = 50 percent increase

	Date: September 11	Date: October 10	Date: November 12
TRX forearm plank	35 sec	50 sec	75 sec
TRX push-up	20	25	30
TRX low row	12	15	18
TRX lunge (left foot)	10	13	15
TRX lunge (right foot)	8	11	14

FIGURE 4.2 Suspension Training assessment tracking sheet for a sample athlete.

Improving Symmetry

Asymmetry refers to the differences between the right side and left side of the body when performing certain exercises. The sample athlete's results in figure 4.2 reveal a right versus left asymmetry of 20 percent on the reverse lunge in the first test. After approximately eight weeks of training, this asymmetry decreased to approximately an eight percent difference. Although this is subject to some debate, a bilateral deficit greater than 10 percent may present a risk of injury. As shown, after 12 weeks of training, injury risk was reduced significantly as a result of the athlete developing greater symmetry between the limbs.

Adjusting the Training Load

Test exercises provide an idea of the current fitness level. Meeting the goals of a training program requires adjusting the resistance by progressing or altering the demands of the exercises to stay in the desired repetition ranges (see table 8.1 on page 165).

Testing is an important step in the design of a training program. Periodically assessing progress provides the best opportunity to achieve the desired results from a training program.

PART II

TRX Suspension Training Exercises

Chapters 5 through 7 present TRX® Suspension Training® exercises that focus on the upper-body, lower-body, and core. Within each chapter, exercises are organized from those that focus on multijoint movements that incorporate multiple muscles and muscle groups, to smaller more isolated movements that focus on specific muscle regions. Furthermore, a variety of modifications aimed at adjusting the intensity of an exercise are also included. Keep in mind that not every variation (e.g., changes in foot position, base of support, or angle of pull) is displayed. It should be noted, that while some exercises may seem very similar, when there is a significant change in body position or in muscle groups utilized, then for the purpose of this work, they are considered new exercises. Remember, chapters 1 and 2 describe additional ways to adjust exercises based on individual constraints, capabilities, and preferences. The reader is encouraged to review these chapters and refer back to them in the future as their fitness level and abilities progress.

CHAPTER 5

Upper-Body Exercises

This chapter presents exercises aimed at developing upper-body flexibility, mobility, muscular strength, and endurance. A major benefit of using TRX Suspension Training to perform upper-body exercises is that the intensity of most exercises can be easily adjusted by stepping closer to or farther from the anchor point, or by adjusting the length of the straps on the TRX Suspension Trainer. Furthermore, advanced lifters can safely increase the intensity of many exercises by adding external resistance, such as weight vests and manual resistance.

Performance of the exercises in this chapter are dependent on three primary factors. The individual should (1) maintain a stable trunk, or braced core, (2) perform the required movements without pain, and (3) be free of any significant orthopedic limitations.

UPPER BODY

FLEXIBILITY AND MOBILITY EXERCISES

TRX Pec Stretch

PURPOSE

To improve chest flexibility and shoulder joint mobility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Face away from the anchor point and grab one handle in each hand using a neutral grip.

DESCRIPTION

- Brace the trunk and extend the arms out to the sides.
- While keeping the arms fully extended, lean forward or walk forward until you have a stretch in the chest (see figure).
- Hold this position for 10 to 30 seconds.

TEACHING CUES

- Stretch to the point of mild tension.
- Do not stretch to the point of pain.
- Maintain a slightly flexed elbow to prevent this joint from hyperextending.
- Alternate the lead and trail leg with subsequent sets.

TRX Single-Arm Kneeling Pec Stretch

PURPOSE

To improve chest flexibility and shoulder joint mobility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

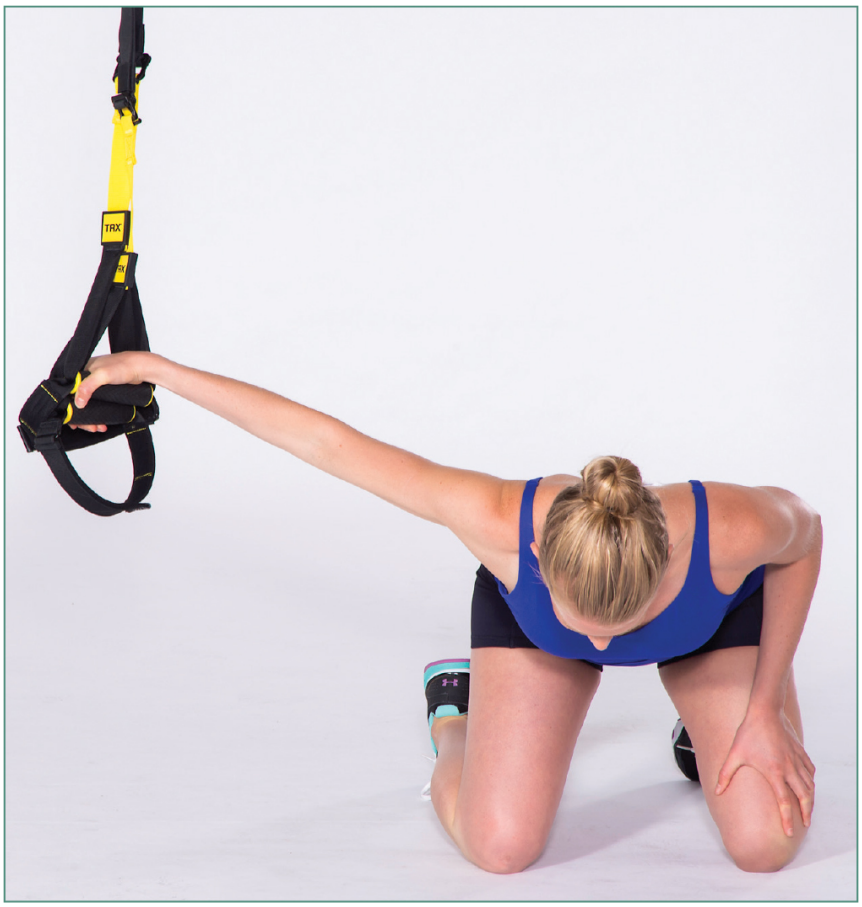
In a kneeling position, face sideways, extend the arm that is closest to the anchor point, and grab both handles.

DESCRIPTION

- Brace the trunk with the working arm straight and the nonworking arm to the side of the body or on the hip.
- Lean forward and rotate the torso away from the extended arm while pushing the hand downward (see figure).
- Hold this position for 10 to 30 seconds, then repeat on the other side.

TEACHING CUES

- Stretch to the point of mild tension.
- Do not stretch to the point of pain.


TRX

TRX Overhead Lat Stretch

PURPOSE

To improve back flexibility and shoulder joint mobility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Face away from the anchor point (or stand sideways to stretch the obliques) and grab a handle with each hand. Assume a staggered stance. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight.
- Lunge forward until the hands are behind the head and lean away from the anchor point until a stretch is felt through the latissimus dorsi (see figure).
- Hold this position for 10 to 30 seconds.

TEACHING CUES

- Stretch to the point of mild tension.
- Do not stretch to the point of pain.

TRX Rear Deltoid Stretch

PURPOSE

To improve shoulder flexibility and mobility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand sideways and hold both straps in the hand that is farther from the anchor point.

DESCRIPTION

- Step laterally, away from the anchor point, until the strap is taut.
- While keeping the arm extended at chest height, lean away from the anchor point until a stretch is felt through the back of the shoulder (see figure).
- Hold this position for 10 to 30 seconds, then repeat on the opposite side.

TEACHING CUES

- For a greater stretch, step farther from the anchor point.
- Stretch to the point of mild tension.
- Do not stretch to the point of pain.

TRX Bent-Over Rear Deltoid Stretch

PURPOSE

To improve shoulder flexibility and mobility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand sideways and hold both straps in the hand that is farthest from the anchor point.

DESCRIPTION

- Step laterally, away from the anchor point, until the strap is taut.
- Hinge forward at the hips (similar to performing a Romanian deadlift), keep the arm extended, and press the hand toward the ground until a stretch is felt in the back of the shoulder (see figure).
- Hold this position for 10 to 30 seconds, then repeat on the other side.

TEACHING CUES

- For a greater stretch, step farther from the anchor point.
- Stretch to the point of mild tension.
- Do not stretch to the point of pain.

TRX Snow Angel

PURPOSE

To improve upper-body flexibility and shoulder joint mobility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to full-length.

STARTING POSITION

Stand facing away from the anchor point and grab a handle with each hand. Set the body in a straight line, or plank position. Assume a staggered stance position and step forward until the hands are behind the head and lean away from the anchor point until a stretch is felt through the latissimus dorsi (see figure *a*).

DESCRIPTION

- Brace the trunk and keep the arms straight.
- While keeping the arms straight slowly swing the arms down toward the hips (see figures *b* and *c*), then return to the starting position.

TEACHING CUES

- Pretend you are making a snow angel.
- Stretch to the point of mild tension.
- Do not stretch to the point of pain.
- Alternate the lead and trail leg with subsequent sets.


a
b
c

UPPER BODY

PUSHING EXERCISES

TRX Standing Push-Up Plus

PURPOSE

To develop the serratus anterior muscles and improve trunk stability.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

Stand facing away from the anchor point and grab a handle with each hand, and position them approximately shoulder-width apart. Set the body in a straight line, or plank position, with the feet hip- to shoulder-width apart.

DESCRIPTION

- Brace the trunk, keep the arms straight, and slowly step backward until there is tension on the straps and the body is at an incline. Simultaneously pull the shoulder blades down and together (see figure *a* and figure *c* inset).
- Keeping the arms straight, push the shoulder blades apart without rounding the shoulders (see figure *b* and figure *d* inset).
- Return to the starting position and repeat for the desired number of repetitions.

TEACHING CUE

- Envision placing the edges of the scapulae in the back hip pockets.

VARIATION

- The intensity of this exercise can be increased by performing this exercise with the feet placed in the foot cradles and hands shoulder-width apart on the ground (see figures *c* and *d*).


a


b


c


d

TRX Chest Press

PURPOSE

To develop upper-body muscular strength and endurance in the chest, shoulders, and triceps, as well as trunk stability.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

Stand facing away from the anchor point and grab a handle with each hand. Extend the arms and position the hands shoulder-width apart. Place the feet hip- to shoulder-width apart. Set the body in a straight line, or in plank position.

DESCRIPTION

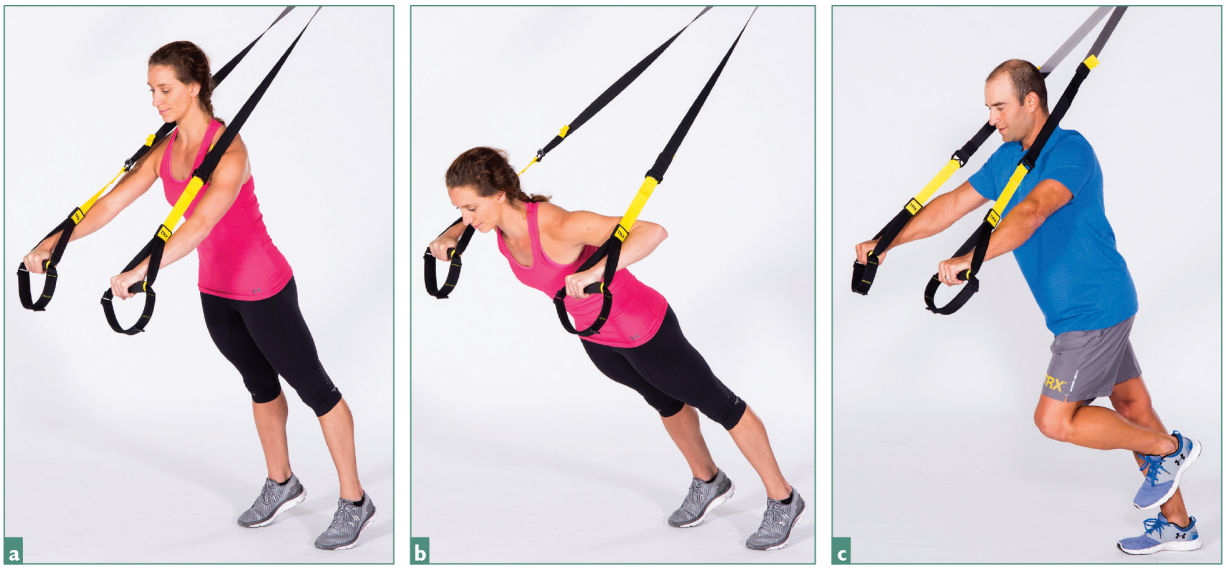
- Brace the trunk and slowly step backward until there is tension on the straps and the body is at an incline (see figure *a*).
- Flex the arms and lower the chest between the handles, similar to performing a push-up (see figure *b*).
- Extend the arms to return to the starting position.

TEACHING CUES

- Stay stiff as a board from the head to heels.
- Move the handles toward the body in a slow, controlled manner.

VARIATIONS

- In order to place a greater emphasis on strength development, additional resistance can be added to this exercise through the use of a weighted vest.
- To emphasize trunk stability and balance, this exercise can be performed using a single leg for support (see figure *c*).


a
b
c

TRX Sprinter Chest Press

PURPOSE

To develop upper-body muscular endurance in the chest, shoulders, and triceps. Additionally, this drill helps develop stability in the hip of the stance leg, as well as hip mobility on the drive-leg side. The ability to stabilize the lower body in these positions is essential during acceleration in sports.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

Stand facing away from the anchor point and grab a handle with each hand. Extend the arms and position the hands shoulder-width apart. Position the feet hip- to shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and slowly step backward until there is tension on the straps and the body is at an incline (see figure *a*).
- Flex the arms and lower the chest between the handles, similar to performing a push-up (see figure *b*).
- Extend the arms and, keeping the left leg straight, drive the right knee forward while keeping the right ankle in a dorsiflexed position. At the peak of the knee drive, extend the ankle of the left leg (see figure *c*).
- Return the right foot to the starting position.
- Repeat using the left leg as the drive leg and the right leg as the stance leg.

TEACHING CUES

- Keep the toe, knee, and heel lifted up on the drive leg.
- Stay stiff as a board from the head to heels.


a
b
c

TRX Push-Up

PURPOSE

To develop muscular endurance and stability of the chest, shoulders, and triceps.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together (see figure *a*).
- Flex at the elbows to lower the body to the ground, keeping the torso flat and rigid, until reaching a 90-degree angle at the elbows (see figure *b*).
- Push back up to the starting position.

TEACHING CUES

- Envision placing the edges of the scapulae in the back hip pockets.
- Stay stiff as a board from the head to heels.
- Slightly tuck the chin.
- Push the ground away.


a


b

TRX Pause Push-Up

PURPOSE

To develop muscular size, strength, and endurance of the chest, shoulders, and triceps.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Place the hands on the ground slightly wider than shoulder-width apart (see figure *a*). Set the body in a straight line, or plank position.

DESCRIPTION

- Flex at the elbows to lower the body to the ground until the upper arms are parallel to the ground and hold this position for approximately three to four seconds (see figure *b*).
- Extend the arms and push the body back to the starting position.
- Repeat for the desired number of repetitions.

TEACHING CUES

- Maintain a plank position.
- Stay stiff as a board from the head to heels.
- Push the ground away.


a


b

TRX Staggered Hand Push-Up

PURPOSE

To develop muscular size, strength, and endurance of the chest, shoulders, and triceps.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Place the hands on the ground approximately shoulder-width apart with one hand placed at forehead level and the other at slightly lower than chest height (see figure *a*). Set the body in a straight line, or plank position.

DESCRIPTION

- Flex the elbows to lower the body to the ground (see figure *b*).
- Extend the arms and push the body back to the starting position.
- Switch hand positions, then repeat for the desired number of repetitions on each side. The same number of repetitions should be performed for each hand position.

TEACHING CUES

- Maintain a plank position.
- Stay stiff as a board from the head to heels.
- Push the ground away.

VARIATIONS

- To increase the intensity of this exercise, maintain a static position in the bottom portion of this movement, similar to what was previously described in the Pause Push-Up.
- Additional resistance can be added to this exercise by using a weighted vest.


a


b

TRX Atomic Push-Up

PURPOSE

To develop muscular endurance and stability of the chest, shoulders, triceps, and rectus abdominis.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together (see figure *a*).
- Flex the elbows to lower the body to the ground (see figure *b*).
- Extend the arms and push the body back to the starting position; drive the knees toward the chest (see figure *c*).
- Return to the starting position.

TEACHING CUES

- Maintain a plank position.
- Stay stiff as a board from the head to heels.
- Push the ground away.
- Drive the knees to the chest.


a


b


c

TRX Push-Up With Oblique Crunch

PURPOSE

To develop muscular endurance and stability of the chest, shoulders, and triceps, and improve thoracic mobility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

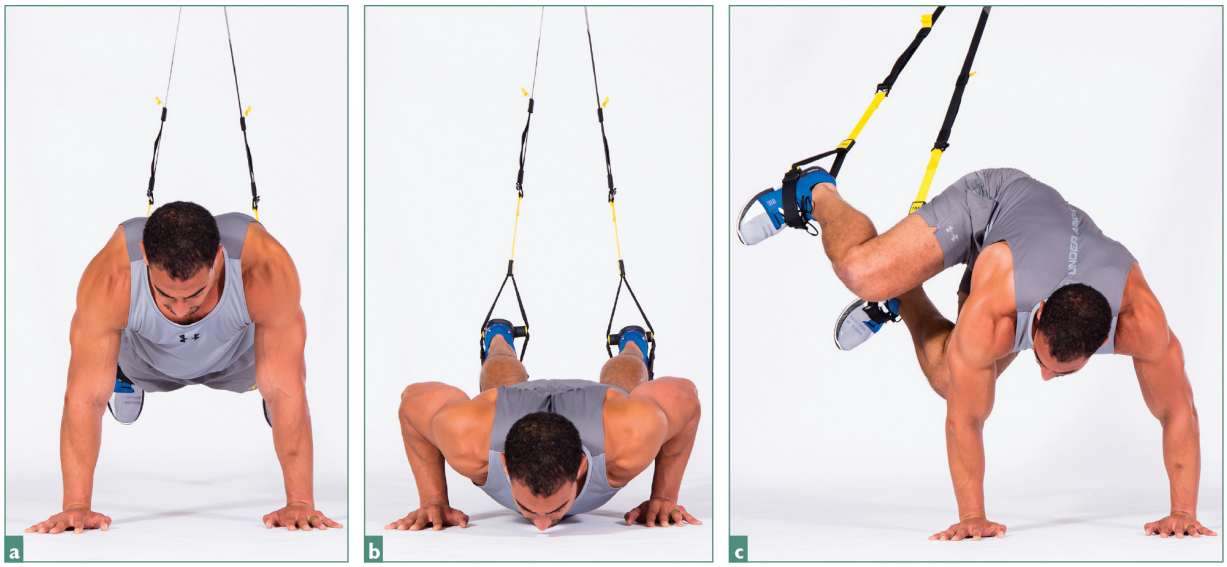
Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart. Set the body in a straight line, or plank position, with the feet hip- to shoulder-width apart.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together (see figure *a*).
- Flex the elbows to lower the body to the ground (see figure *b*).
- Extend the arms and push back to the starting position while rotating the hips (see figure *c*).

TEACHING CUES

- Stay stiff as a board from the head to heels.
- Slightly tuck the chin.
- Try to use as little momentum as possible to execute the movement.
- Push the ground away when performing the push-up.


a
b
c

TRX Push-Up to Pike

PURPOSE

To develop muscular endurance and stability of the chest, shoulders, triceps, hip flexors, and rectus abdominis.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

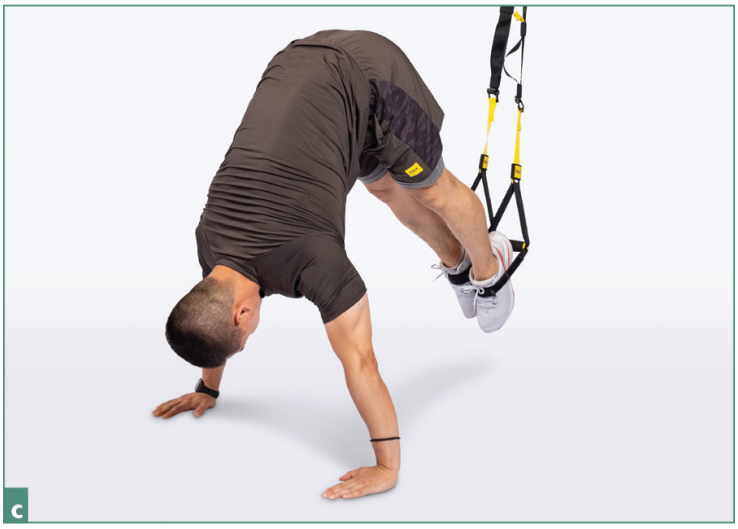
- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together (see figure *a*).
- Flex the elbows to lower the body to the ground (see figure *b*).
- Extend the arms and push the body back to the starting position. Once back to the starting position, flex at the hips, pushing the buttocks up. Keep the legs completely straight while bringing the feet toward the chest (see figure *c*).
- Return to the starting position and repeat for the desired number of repetitions.

TEACHING CUES

- Maintain a plank position.
- Stay stiff as a board from the head to heels.
- Push the ground away when performing the push-up.
- Push the hips toward the sky or ceiling.


a


b


c

TRX Incline Push-Up

PURPOSE

To develop muscular strength and endurance, and stability of the chest, shoulders, and triceps.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place one foot in both foot cradles. Position the hands on the ground shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together.
- Raise the support leg off the ground and position it parallel to the foot in the foot cradles (see figure *a*).
- Flex the elbows to lower the body to the ground, keeping the torso flat and rigid (see figure *b*).
- Push back to the starting position.

TEACHING CUES

- Envision placing the edges of the scapulae in the back hip pockets.
- Push the ground away. Do not perform with both feet in separate foot cradles; doing so makes achieving the proper body position more difficult and may increase injury risk.
- Be sure to switch legs in order to make certain that isometric strength and muscular symmetry are developed uniformly on both sides.


a


b

TRX Diamond Push-Up

PURPOSE

To develop muscular size, strength, and endurance of the triceps muscles. This exercise also can be used to develop the muscles of the chest and shoulders.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Place the hands on the ground less than shoulder-width apart, in a diamond shape (see figure *a*). Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together.
- Flex the elbows to lower the body to the ground (see figure *b*). Extend the arms and push the body back to the starting position. Repeat for the desired number of repetitions.

TEACHING CUES

- Maintain a plank position.
- Stay stiff as a board from the head to heels.
- Push the ground away.


a


b

TRX Prone Iron Cross

PURPOSE

To develop shoulder and core strength and stability.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing away from the anchor point. Grab a handle with each hand and position the hands against the torso, just below the underarms. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and slowly step backward until there is tension on the straps and the body is at an incline (see figure *a*).
- Slowly extend the arms, pushing them out to the sides, similar to a T position (see figure *b*).
- Return the arms to the starting position against the torso.

TEACHING CUES

- Brace the trunk as if ready to take a punch to the abdomen.
- Stay stiff as a board from the head to heels.

VARIATIONS

- Instead of extending the arms simultaneously, extend one arm, maintain the posture, and then extend the other arm, moving in a unilateral fashion.
- Additional resistance can be added to this exercise by using a weighted vest.


TRX
a


TRX
b

TRX Chest Fly

PURPOSE

To develop the pectoralis major, which is responsible for horizontal adduction of the arms.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

Stand facing away from the anchor point and grab a handle with each hand. Place the feet hip- to shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight.
- Internally rotate the shoulders so the elbows point out to the sides (see figure *a*).
- Keeping the arms locked in this position, slowly push the hands away from each other while pulling the shoulder blades down and together.
- Attempt to move the hands outward until they are almost directly aligned with the torso, or until a deep stretch is felt in the chest (see figure *b*).
- In this position, bring the hands back to the starting position.

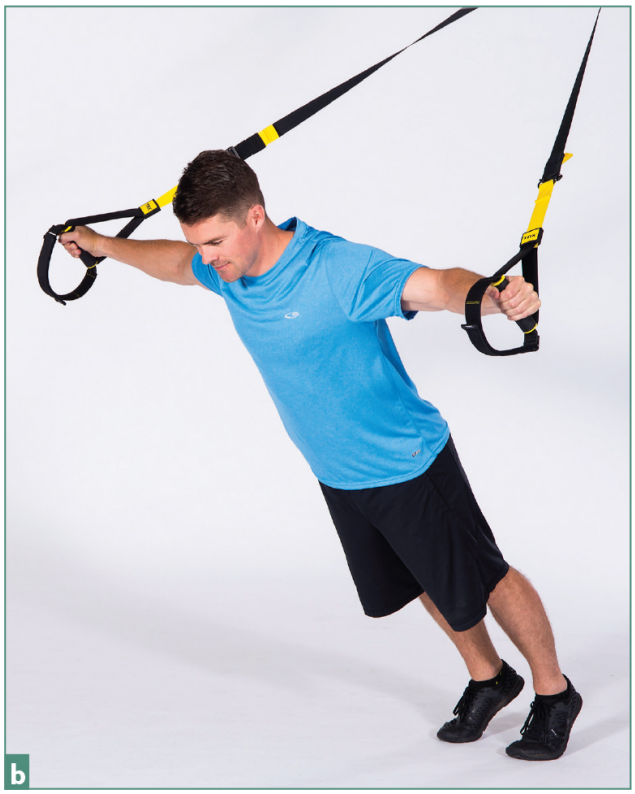
TEACHING CUES

- When returning to the starting position, act as if wrapping the hands around a tree trunk.
- Maintain a rigid torso throughout the exercise.

VARIATION

- Raising one foot off the ground increases the need for greater balance and trunk stability.


a


b

TRX Clock Press

PURPOSE

To develop shoulder and trunk stability.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing away from the anchor point with the feet hip- to shoulder-width apart. Grab a handle with each hand and position the hands against the torso just below the underarms. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and step backward slowly until there is tension on the straps and the body is at an incline (see figure *a*).
- Slowly extend the arms, pushing them out to the sides, similar to a T position.
- Return the arms to the starting position against the torso, then repeat this movement while pressing the left hand to the 2 o'clock position and the right hand to the 8 o'clock position (see figure *b*).
- Return the arms to the starting position against the torso, then repeat this movement pressing the left hand to the 4 o'clock position and the right hand to the 10 o'clock position.
- Return to the starting position and repeat this series three or four times.

TEACHING CUES

- Brace the trunk as if ready to take a punch to the abdomen.
- Stay stiff as a board from the head to heels.


a


b

TRX Standing Shoulder Press

PURPOSE

To strengthen the upper back and deltoids muscles.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using an overhand grip. Stagger the feet and position them hip- to shoulder-width apart. Keep the elbows in line with the center of the breastbone, and position the handles toward the ears, lean back until the torso is at approximately a 60- to 70-degree angle (see figure *a*).

DESCRIPTION

- Slowly extend the elbows and press the hands overhead (see figure *b*).

TEACHING CUES

- Stay stiff as a board from the head to heels.
- Brace the trunk.
- Squeeze the shoulder blades together at the bottom movement.


a


b

TRX Inverted Shoulder Press

PURPOSE

To develop strength, stability, and muscular endurance in the shoulders.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place one foot in both foot cradles. The hands are on the ground shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight.
- Flex at the hips until the torso is nearly vertical (see figure *a*).
- Flex the elbows to lower the head to the ground until attaining a 90-degree angle at the elbows (see figure *b*).
- Push back to the starting position.

TEACHING CUES

- Use a partial range of motion for this exercise until the strength and stability in the trunk and shoulders are sufficient to achieve a 90-degree angle at the elbows.
- Maintain a stiff torso.
- Be sure to switch legs in order to make certain that isometric strength and muscular symmetry are developed uniformly on both sides.

VARIATION

- Pike to Inverted Shoulder Press: To increase the stress placed on the abdominals, start in the plank position and while keeping the legs extended, push the hips toward the ceiling to perform the pike exercise. Once this position has been achieved, perform an inverted shoulder press.


a


b

TRX Drop Push-Up

PURPOSE

This exercise accentuates eccentric loading of the chest, shoulders, and triceps. It can be used to teach proper landing technique prior to performing explosive, plyo, or depth drop plyo push-ups.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Position the hands on the ground shoulder-width apart with the elbows lower than the shoulders. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together (see figure *a*).
- Jump the hands to the sides slightly wider than shoulder width (see figure *b*), flexing at the elbows to absorb the landing (see figure *c*).
- Push back up to the starting position.

TEACHING CUES

- Absorb the landing softly, and land as quietly as possible.
- Maintain a rigid torso throughout the exercise.
- Push the ground away.


a


b


c

TRX Explosive Push-Up

PURPOSE

To develop power in the upper body. This exercise minimizes the effects of the stretch–shortening cycle and focuses on concentric force production. This variation of the traditional explosive push-up (in which the feet are on the ground) increases the load placed on the upper body.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Position the hands on the ground shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together (see figure *a*).
- Flex the elbows to lower the body to the ground, while keeping the torso flat and rigid, until creating a 90-degree angle at the elbows (see figure *b*).
- Hold this position for one or two seconds, then push off the ground as rapidly as possible so the hands lose contact with the ground (see figure *c*).
- Upon landing, flex the elbows and extend the shoulders slightly to absorb the landing (see figure *d*).

TEACHING CUES

- Absorb the landing softly, and land as quietly as possible.
- Maintain a rigid torso throughout the exercise.
- Push the ground away.


TRX
a


TRX
b


TRX
c


TRX
d

TRX Plyo Push-Up

PURPOSE

To develop power in the upper body. This exercise maximizes the effects of the stretch–shortening cycle and focuses on the use of stored elastic energy within the muscle tissue and tendons to produce explosive force and power. This variation of the traditional plyo push-up (in which the feet are on the ground) increases the load.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie on the ground facing away from the anchor point and place the feet in the foot cradles. Position the hands on the ground shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together (see figure *a*).
- Rapidly flex the elbows to lower the body to the ground, while keeping the torso flat and rigid (see figure *b*).
- Once a 90-degree angle at the elbows is attained, immediately push off the ground as fast as possible so the hands lose contact with the ground (see figure *c*). It is not necessary to clap the hands when performing this exercise.
- Upon landing, flex the elbows and extend the shoulders slightly to absorb the landing (see figure *d*).

TEACHING CUES

- Absorb the landing softly, and land as quietly as possible.
- Maintain a rigid torso throughout the exercise.
- Explosively push the ground away.


a


b


c


d

TRX Kneeling Triceps Press

PURPOSE

To isolate and develop the triceps and develop isometric trunk stability. Using the Suspension Trainer for this exercise results in greater total-body development than traditional barbell and dumbbell versions of this exercise.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Begin with both knees on the ground facing away from the anchor point. Grab a handle in each hand and lean forward so the torso is at an angle of at least 45 degrees to the ground.

DESCRIPTION

- Position the upper arms perpendicular to the torso and flex the elbows to 90 degrees. At this point, the hands should be at forehead height (see figure *a*).
- While keeping the lower legs and knees in contact with the ground, and the trunk rigid, extend the elbows (see figure *b*).
- Slowly allow the elbows to flex to return to the starting position.

TEACHING CUES

- Maintain a rigid torso throughout the exercise.
- Move only at the elbows.


a


b

TRX Kneeling Overhead Triceps Press

PURPOSE

To isolate and develop the triceps and develop isometric trunk stability. The Suspension Trainer results in greater total-body development than traditional barbell and dumbbell versions of this exercise.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Begin by kneeling and facing away from the anchor point. Grab a handle with each hand and lean forward so the torso is at an angle of at least 45 degrees to the ground.

DESCRIPTION

- Extend the arms overhead with the upper arms beside the ears (see figure *a*).
- Flex the elbows to 90 degrees. At this point, the hands should be behind the head with a neutral grip (see figure *b*).
- While keeping the lower legs and knees in contact with the ground, and the trunk rigid, extend the elbows to return to the starting position.

TEACHING CUES

- Maintain a rigid torso throughout the exercise.
- Move only at the elbows.


a


b

TRX Standing Skull Crusher

PURPOSE

To isolate and develop the triceps and develop isometric trunk stability. The Suspension Trainer results in greater total-body development than traditional barbell and dumbbell versions of this exercise.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing away from the anchor point. Grab a handle in each hand and lean forward so the torso is at an angle of at least 45 degrees to the ground.

DESCRIPTION

- Position the upper arms perpendicular to the torso and flex the elbows to 90 degrees. At this point, the hands should be at forehead height (see figure *a*).
- While keeping the feet in contact with the ground and the trunk rigid, extend the elbows (see figure *b*).
- Slowly flex the elbows to return to the starting position.

TEACHING CUES

- Stay stiff as a board from the head to heels.
- Move only at the elbows.


a


b

TRX Triceps Press

PURPOSE

To isolate and develop the triceps and develop isometric trunk strength and stability. Using the Suspension Trainer results in greater total-body development than using traditional barbell and dumbbell versions of this exercise.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

Stand facing away from the anchor point. Grab a handle with each hand and lean forward so the torso is at an angle of at least 45 degrees to the ground.

DESCRIPTION

- Extend the arms overhead with the upper arms beside the ears (see figure *a*).
- Flex the elbows to 90 degrees. At this point, the hands should be behind the head with a neutral grip (see figure *b*).
- While keeping the balls of the feet in contact with the ground and the trunk rigid, extend the elbows to return to the starting position.

TEACHING CUES

- Maintain a rigid torso throughout the exercise.
- Move only at the elbows.

VARIATIONS

- External resistance in the form of a weighted vest can be added to this exercise to increase the intensity.
- This exercise can also be modified by grabbing the handle straps with one hand, assuming a staggered stance, and applying manual resistance throughout the exercise movement.


a


b

TRX Scapular Retraction

PURPOSE

To develop strength in the rhomboids and upper and lower trapezius muscles, which surround the scapulae.

ADJUSTMENT

Fully shorten the straps of the Suspension Trainer.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand. Position the feet about hip- to shoulder-width apart and lean back until the torso is at a 45-degree angle to the ground (see figure *a*).

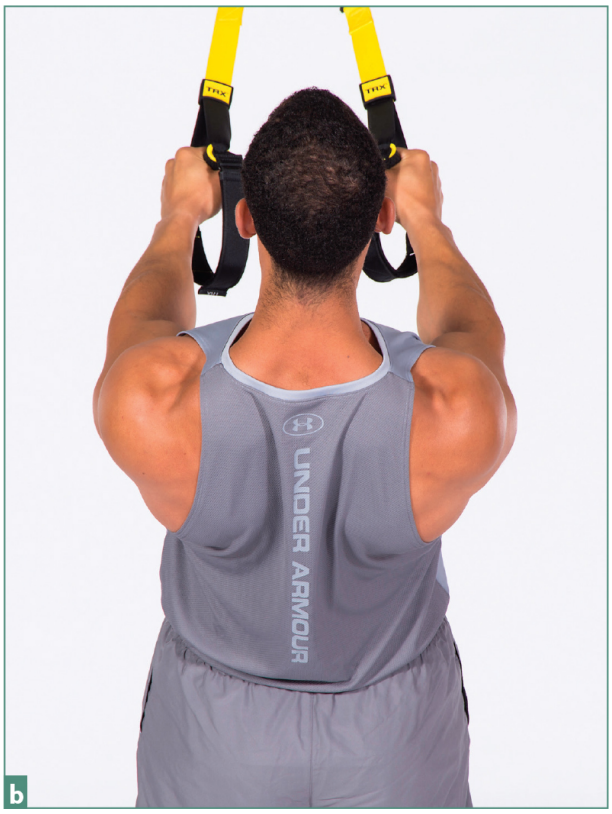
DESCRIPTION

- Pull the shoulder blades together and downward (see figure *b*).
- Without shrugging the shoulders, slowly allow the shoulder blades to separate and return to the starting position.

TEACHING CUES

- Envision placing the edges of the scapulae in the back hip pockets.
- Brace the core.


UNDER ARMOUR
a


UNDER ARMOUR
b

TRX Low Row

PURPOSE

To develop the muscles of the back.

ADJUSTMENT

Fully shorten the straps of the Suspension Trainer.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using a neutral, overhand, or supinated grip. Lean back until the torso is at a 45-degree angle to the ground.

DESCRIPTION

- Pull the shoulder blades together and downward (see figure *a*).
- Pull the body toward the anchor point by flexing the arms and extending the shoulders (see figure *b*).
- Slowly extend the arms and allow the shoulders to flex to return to the starting position.

TEACHING CUES

- Maintain a braced core throughout the exercise and squeeze the glutes.
- Pull the straps to the chest.

VARIATION

- The intensity of this exercise can be increased by elevating the feet on a step or box while planking, by adding a weighted vest, or by performing the single-arm variation.


a


b

TRX Assisted Chin-Up

PURPOSE

To strengthen the muscles of the back and biceps.

ADJUSTMENT

Overshorten the straps of the Suspension Trainer.

STARTING POSITION

Grasp the handles and simultaneously perform a full squat while extending the arms overhead (see figure *a*).

DESCRIPTION

- Squeeze the back muscles and pull yourself up toward the handles so that the upper chest is level with the handles (see figure *b*). The legs can be used to provide support and assistance if a sticking point is reached during this movement.

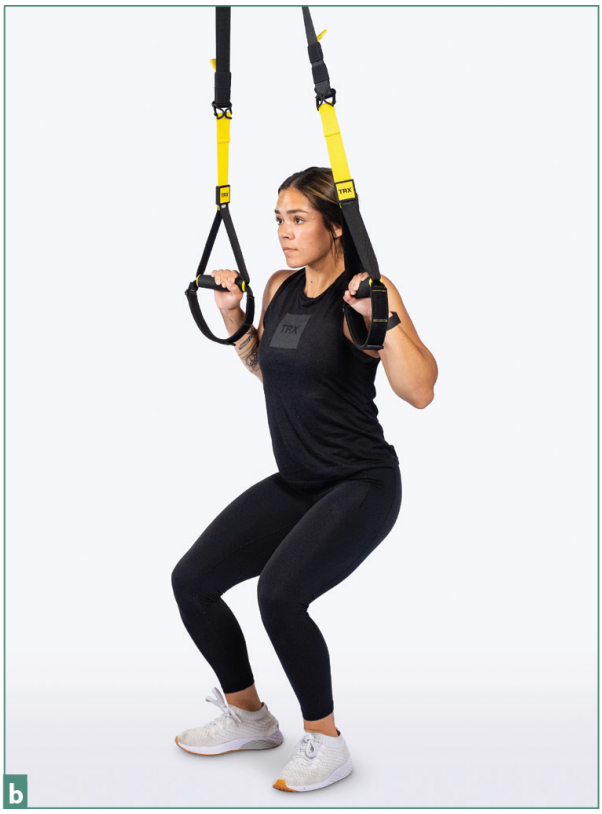
TEACHING CUE

- Pull the handles to your shoulders.

VARIATION

- A greater emphasis can be placed on the muscles of the biceps by using a neutral or underhand grip when performing this exercise.


a


b

TRX Inverted Row

PURPOSE

To develop the muscles of the back.

ADJUSTMENT

Shorten the handles to hip height (over shortened).

STARTING POSITION

Stand facing the anchor point and grab a handle in each hand using a neutral, overhand, or supinated grip. Position the feet hip- to shoulder-width apart. Extend the arms and walk underneath the anchor point until the chest is under the anchor point. While keeping the arms completely straight, slowly flex the knees and lean back until the torso is parallel to the ground and the knees are at a 90-degree angle.

DESCRIPTION

- Pull the shoulder blades together and downward (see figure *a*).
- Pull the body toward the anchor point by flexing the arms and extending the shoulders while allowing the knees to extend to 110 to 120 degrees at the apex of the pull (see figure *b*).
- Extend the arms and allow the shoulders to flex to return to the starting position.

TEACHING CUES

- Maintain a braced core throughout the exercise and squeeze the glutes.
- Pull the straps to the chest.

VARIATION

- The intensity of this exercise can be increased by slowly lowering the body back to the starting position (i.e., a 1:3; 1:4 count).


a


b

TRX High Row

PURPOSE

To develop the muscles of the upper back and shoulders.

ADJUSTMENT

Fully shorten the straps of the Suspension Trainer.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using a neutral, overhand, or supinated grip. Position the feet hip- to shoulder-width apart. While keeping the arms completely straight, lean back until the torso is at a 45-degree angle to the ground while pulling the shoulder blades together and downward (see figure *a*).

DESCRIPTION

- While keeping the elbows in line with the center of the breastbone, pull the body toward the anchor point by flexing the arms and pulling the handles toward the underarms. At this point, the hands and the elbows should be in line with one another (see figure *b*).
- Slowly extend the arms and allow the shoulders to flex to return to the starting position.

TEACHING CUES

- Do not lift the elbows above the shoulders.
- Keep the core braced and squeeze the glutes.


a


b

TRX High Row to Y

PURPOSE

To strengthen the rhomboids, upper and lower trapezius, and rotator cuff muscles.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using an overhand grip. Assume a staggered stance (or place the feet hip-width apart for more of a challenge). Lean back until the torso is at a 45-degree angle to the ground while pulling the shoulder blades together and downward and keeping the arms completely straight (see figure *a*).

DESCRIPTION

- Perform a high row as previously described on page 82. At this point, the hands and the elbows should be in line with one another (see figure *b*).
- Move the arms outward, rotate the shoulders, and extend the arms to form a Y (see figure *c*).
- Now, slowly lower the arms back to the T position, then extend them and return to the starting position.

TEACHING CUES

- Do not lift the elbows above the shoulders during the high row portion of the exercise.
- Brace the core.


a
b
c

TRX Biceps Curl

PURPOSE

To develop the biceps.

ADJUSTMENT

Fully shorten or adjust the straps of the Suspension Trainer to mid length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using an underhand or supinated grip. Position the feet hip- to shoulder-width apart. Keeping the arms completely straight, lean back until the torso is at a 45-degree angle to the ground (see figure *a*).

DESCRIPTION

- Pull the shoulder blades together and downward, flex the elbows, and bring the hands toward the face (see figure *b*).
- Extend the elbows and return to the starting position.

TEACHING CUES

- Move only at the elbows.
- Brace the trunk and squeeze the glutes.

VARIATIONS

- An overhand grip can be used, which places a greater emphasis on the brachialis and brachioradialis.
- The intensity of this exercise can be increased by performing a single-arm variation.


a


b

TRX Dual-Arm External Rotation

PURPOSE

To strengthen the rotator cuff and develop the deltoids.

ADJUSTMENT

Fully shorten or adjust the straps of the Suspension Trainer to mid length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using a neutral grip. Stagger the feet into an offset foot position. Flex the elbows at 90 degrees and hold them and the upper arms against the body (see figure *a*).

DESCRIPTION

- While keeping the body rigid and elbows flexed, externally rotate at the shoulders by pushing the hands away from the body (see figure *b*).
- Return to the starting position and perform the desired number of repetitions.

TEACHING CUES

- Keep the elbows locked to the torso.
- Brace the core.


a


b

TRX W Deltoid Fly

PURPOSE

To strengthen the upper back, deltoids, and the rotator cuff muscles.

ADJUSTMENT

Fully shorten the straps of the Suspension Trainer.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using a neutral, overhand, or supinated grip. Position the feet hip- to shoulder-width apart. Keep the arms flexed at 90 degrees while leaning back until the torso is at a 45-degree angle to the ground and pulling the shoulder blades together and downward (see figure *a*).

DESCRIPTION

- Keep the elbows in line with the center of the breastbone, and pull the handles toward the ears, using only the shoulders to rotate them up (see figure *b*). At this point, the hands and the elbows should be in line with the ears.
- Slowly lower the arms to the starting position.

TEACHING CUES

- Rotate only at the shoulders.
- Brace the core.


a


b

TRX T Deltoid Fly

PURPOSE

To develop the muscles of the rear deltoids, as well as trunk stability.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand. Position the hands against the torso just below the underarms. The feet should be hip- to shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and slowly step forward until there is tension on the straps and the body is at an incline (see figure *a*).
- Slowly extend the arms, pushing them out to the sides, similar to a T position (see figure *b*).
- Return to the starting position.

TEACHING CUES

- Push the hands straight out to the sides.
- Squeeze the shoulder blades together and put them in the back hip pockets.


a


b

TRX I, Y, T Deltoid Fly

PURPOSE

To strengthen the rhomboids, upper and lower trapezius, and rotator cuff muscles.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand. Assume a staggered stance. Lean back until the torso is at a 45-degree angle to the ground while pulling the shoulder blades together and downward and keeping the arms completely straight (see figure *a*).

DESCRIPTION

- Moving only at the shoulders, rotate the arms and position them directly overhead to form an I (see figure *b*), at a 45-degree angle over the head to form a Y (see figure *c*), and finally directly out to the sides to form a T (see figure *d*).
- Return to the starting position prior to performing each movement.

TEACHING CUES

- Maintain a stiff torso.
- Pause at the top of each movement for one second before returning to the starting position.


a


b


c


d

TRX T Fly

PURPOSE

To strengthen the rhomboids, upper and lower trapezius, and rotator cuff muscles.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using a neutral grip. Position the feet hip- to shoulder-width apart. Keep the arms slightly flexed. Lean back until the torso is at a 45-degree angle to the ground while pulling the shoulder blades together and downward (see figure *a*).

DESCRIPTION

- Maintain a slightly flexed elbow, and internally rotate the shoulders so the elbows point out to the sides.
- While keeping the arms locked in this position, slowly push the hands away from each other while pulling the shoulder blades down and together.
- Attempt to move the hands outward until they are almost directly aligned with the torso (see figure *b*).
- Bring the hands back to the starting position.

TEACHING CUES

- Keep the elbows slightly flexed throughout the exercise and lock them in this position.
- Brace the core.
- Do not shrug the shoulders during the movement.


a


b

TRX Dual-Arm Internal Rotation

PURPOSE

To strengthen the rotator cuff muscles, deltoids, and pectoralis major.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using a neutral grip. Position the feet hip- to shoulder-width apart and lean back until the torso is at a 45-degree angle to the ground. Flex the elbows to 90 degrees and hold the elbows and the upper arms against the body (see figure *a*).

DESCRIPTION

- While keeping the body rigid, flex the elbows and internally rotate at the shoulders by pulling the hands toward the opposite elbows (see figure *b*).
- With each repetition, switch the arm that is on top.

TEACHING CUES

- Keep the elbows locked to the torso.
- Brace the core.


a


b

TRX Split Fly

PURPOSE

To strengthen the rhomboids, upper and lower trapezius, and rotator cuff muscles.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using a neutral grip. Position the feet hip- to shoulder-width apart. Use an offset foot position. While keeping the arms slightly flexed, lean back until the torso is at a 45-degree angle to the ground while pulling the shoulder blades together and downward (see figure *a*).

DESCRIPTION

- Maintain a slightly flexed elbow; while keeping the arms locked in this position, slowly push the hands away from each other while pulling the shoulder blades down and together.
- Attempt to move the hands outward until they are almost directly aligned with the torso (i.e., 3 o'clock and 9 o'clock positions) (see figure *b*).
- Now, bring the hands back to the starting position.
- Repeat this action by moving the hands in the following combinations:
  - Right hand to the 1 o'clock position and left hand to the 7 o'clock position.
  - Right hand to the 5 o'clock position and left hand to the 10 o'clock position.

TEACHING CUES

- Keep the elbows slightly flexed throughout the exercise and lock them in this position.
- Brace the core.
- Do not shrug the shoulders during the movement.


a


b

TRX Wrist Roller

PURPOSE

To develop the muscles of the forearms.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point and grab a handle with each hand using an underhand or supinated grip. Position the feet hip- to shoulder-width apart. Keep the arms completely straight while leaning back until the torso is at a 45-degree angle to the ground (see figure *a*).

DESCRIPTION

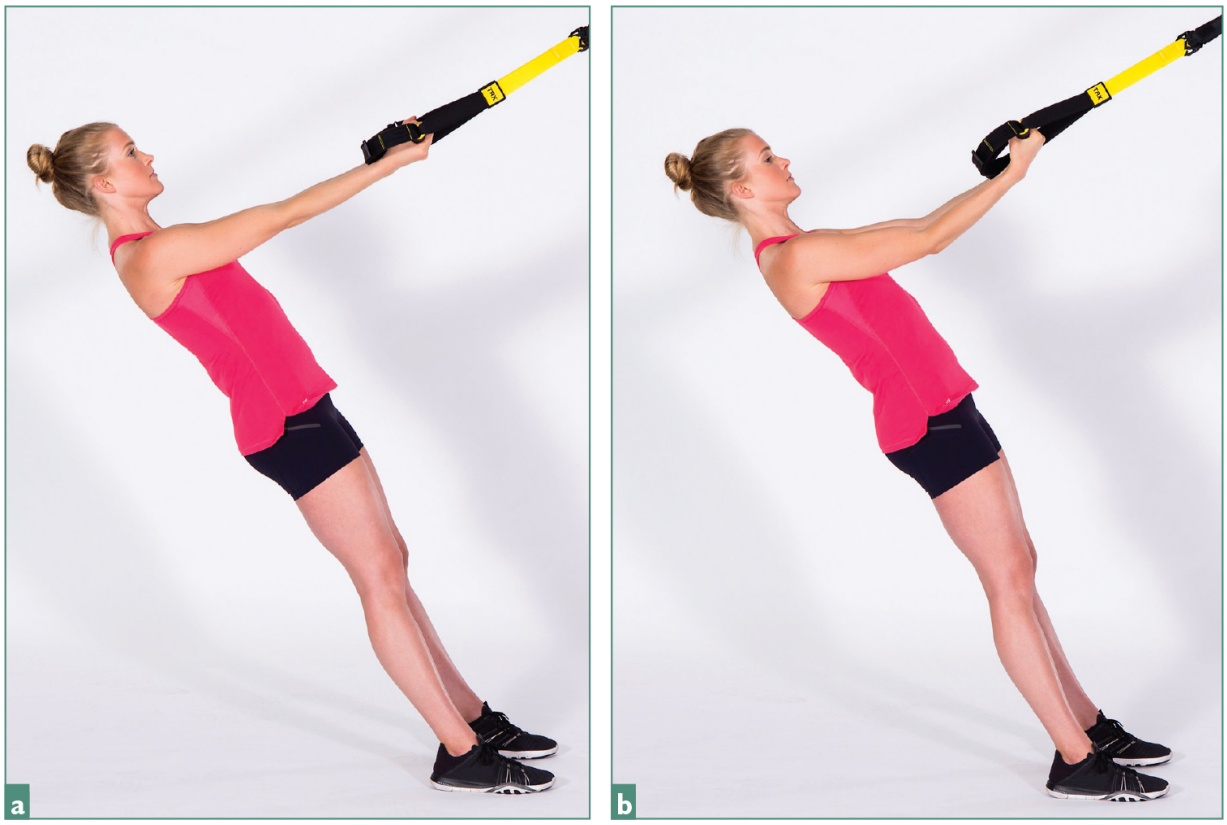
- Pull the shoulder blades together and downward, then flex the wrists so that the palms of the hands are facing toward the body (see figure *b*). Return to the starting position then extend the wrists so that the back of the hands are facing toward the body.
- Extend the wrists and return to the starting position.

TEACHING CUES

- Move only at the wrists.
- Brace the trunk and squeeze the glutes.

VARIATION

- Wrist extensions can also be performed in the same manner by using an overhand or pronated grip.



CHAPTER 6

Lower-Body Exercises

The chapter presents exercises to develop lower-body flexibility and mobility, endurance, strength, and power. For advanced lifters, adding external resistance such as sandbags and weighted vests can safely increase the intensity of many of the exercises.

TRX Y Balance

PURPOSE

To develop ankle mobility, single-leg balance, and hip stability.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

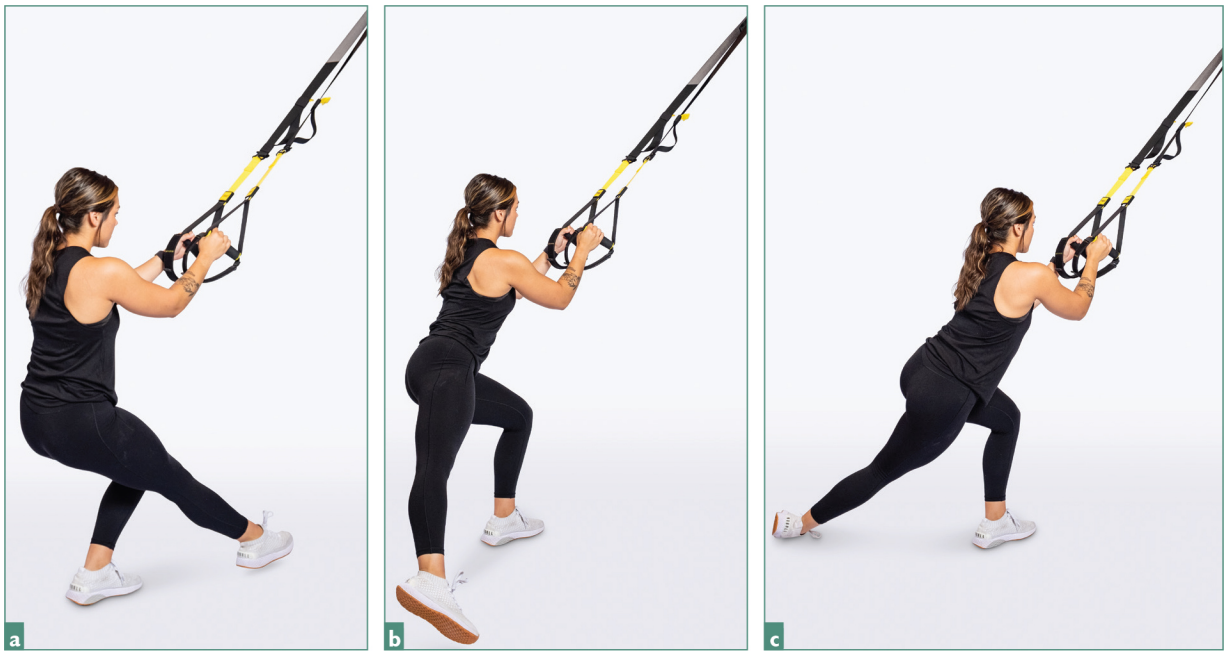
Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Assume a single-leg stance with the support foot maintaining full contact with the ground and the free foot about three inches (8 cm) off the ground.
- Point the toe downward and slide the free foot forward as far as possible (see figure *a*). Return to the starting position, then repeat this motion sliding the free foot back and diagonally out to the side (see figure *b*). Return to the starting position then slide the free foot back and diagonally behind the stance leg (see figure *c*).
- Switch legs and repeat using the opposite side.

TEACHING CUES

- Slide the free foot along the ground as if you were writing the letter Y with your foot.
- Do not move the support knee forward past the toes of the support foot.
- Make sure the big toe, little toe, and heel remain in contact with the ground on the stance foot throughout the movement.


a
b
c

TRX Deep Squat

PURPOSE

To improve mobility at the ankles, knees, and hips, as well as lower-body muscular endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Point the toes outward slightly (see figure *a*).
- Squat as low as possible, or until the knees are flexed to more than 90 degrees. The knees should remain behind, or directly over, the toes (see figure *b*). Maintain a tall, neutral spine.
- Extend the hips, knees, and ankles, and return to the starting position.

TEACHING CUES

- Imagine standing in the center of a square and drop the hips to the middle of the square.
- Keep the weight evenly distributed among the big toe, little toe, and heel.


a


b

TRX Adductor Stretch

PURPOSE

To develop hip mobility and stretch the adductors of the inner thigh.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point with the feet wider than shoulder width, feet facing forward, and the heels in line with the middle toes. Grasp the handles, bend the elbows, align the upper arms by the waist with palms facing one another, and step back until there is no slack in the straps (see figure *a*).

DESCRIPTION

- Drop the hips down and back toward the right while keeping the chest up (see figure *b*). Keep both heels anchored on the floor. The bent knee should not go in front of the toes. Keep the bent knee in line with middle toe. This position will stretch the adductors of the left leg.
- Hold this position for 5 to 10 seconds.
- Repeat for a total of 30 to 60 seconds, then perform on the opposite side.

TEACHING CUES

- Keep the hips low, chest up, and eyes focused straight ahead.
- Perform each stretch to the point of mild discomfort.
- Discontinue if pain is felt at any time during the movement.


a


b

TRX Iliotibial (IT) Band Stretch

PURPOSE

To stretch the iliotibial band.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Face sideways to the anchor point and grasp the handles overhead in both hands using a neutral grip.

DESCRIPTION

- Stand side facing in a split stance with one shoulder toward the anchor point, keep the arms slightly flexed, and lean away from the anchor point by allowing the trunk to flex laterally toward the anchor point and the hips to shift away from the anchor point (see figure). Hold this position for 5 to 10 seconds. Repeat for a total of 30 to 60 seconds, then perform on the opposite side.

TEACHING CUES

- Drop the hip furthest from the anchor point toward the ground.
- Hold each stretch to the point of mild discomfort.
- Never stretch to the point of pain.


TRX

TRX Single-Leg Romanian Deadlift

PURPOSE

To develop single-leg balance and hip stability while stretching the hamstring of the stance leg.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, press the palms down into the handles with the arms extended toward the anchor point at waist height. Step back until there is no slack in the straps.

DESCRIPTION

- Assume a single-leg stance with the support foot maintaining full contact with the ground and the free foot lifted off the ground (see figure *a*).
- Flex at the hip while extending the free leg away from the anchor point (see figure *b*).
- Keep the arms straight and, while holding the handles, reach out as far as possible toward the anchor point.
- Hold this position for 5 to 10 seconds.
- Repeat for a total of 30 to 60 seconds, then perform on the opposite side.

TEACHING CUES

- Keep the hips neutral.
- Rotate the toes of the upper foot downward toward the floor to assist. This typically puts the hip in the appropriate position and prevents rotation. When the hip externally rotates the hamstring, the standing leg shortens and the stretch is less effective.
- Stretch to the point of mild discomfort.
- Never stretch to the point of pain.

VARIATION

- Reaching forward using only one hand (the opposite hand to the stance leg) increases the balance challenge of this exercise.

TRX Pigeon Stretch

PURPOSE

To improve hip mobility and low back flexibility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Facing the anchor point, sit on the ground with one leg outstretched behind and the other leg externally rotated, knee flexed in front. Grasp a handle with each hand (see figure *a*).

DESCRIPTION

- Lean forward, extending the chest toward the ground.
- Stretch to the point of mild discomfort, hold for 5 to 10 seconds, and then return to the starting position (see figure *b*).
- Repeat for a total of 30 to 60 seconds, then perform on the opposite side.

TEACHING CUES

- Maintain a big chest position.
- Work toward squaring your hips and shoulders to the floor.
- Breathe out while reaching forward.


a


b

TRX Figure-Four Stretch

PURPOSE

To stretch the piriformis muscle and improve single-leg balance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

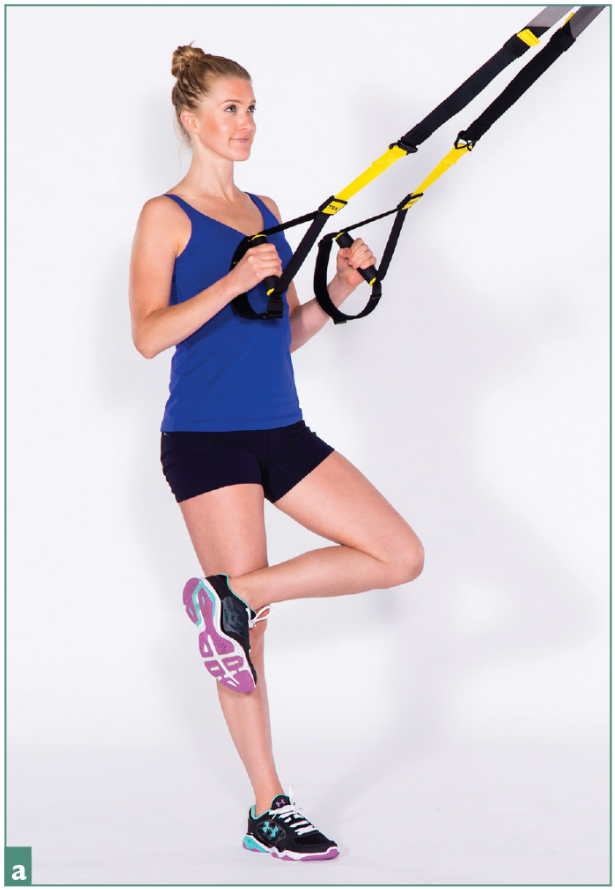
Stand facing the anchor point and grasp a handle with each hand (see figure *a*). Bend the elbows, align the upper arms by the waist with the palms facing one another. Stand on one foot, bend the standing knee, and cross the ankle of the other foot over the knee of the standing leg.

DESCRIPTION

- Squat until the standing knee is at 90 degrees (see figure *b*). Let the arms extend as you squat. Stretch to the point of mild discomfort, hold for 5 to 10 seconds, and then return to the starting position.
- Repeat for 30 to 60 seconds, then perform on the other side.

TEACHING CUES

- Maintain a big chest position and stay tall throughout the movement.
- Breathe out while descending into the squat position.


a


b

TRX Reaching Hip Flexor Stretch

PURPOSE

To stretch the hip flexor muscles.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand on the left foot facing the anchor point, grab the handles with the left hand, grab the right ankle with the right hand, and pull it back toward the buttock (see figure *a*).

DESCRIPTION

- While keeping the hips facing the anchor point, flex forward at the waist (see figure *b*).
- Pull the right ankle back while pushing the right hip toward the ground.
- Stretch to the point of mild discomfort, hold for 5 to 10 seconds, and then return to the starting position.
- Repeat for 30 to 60 seconds, then perform on the opposite side.

TEACHING CUES

- Keep the hips pointed toward the ground when leaning forward; do not let them rotate.
- Maintain a big chest position and stay tall throughout the movement.
- Breathe out on the descent.


a


b

LOWER BODY

TRAINING EXERCISES

TRX Bodyweight Squat

PURPOSE

To improve lower-body muscular strength and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Point the toes outward slightly (see figure *a*).
- Squat until the top of the knees are flexed to 90 degrees or more. The knees should remain behind, or directly over, the toes (see figure *b*). Maintain a tall, neutral spine.

TEACHING CUES

- Imagine standing in the center of a square and drop the buttocks to the middle of the square.
- Keep the weight evenly distributed among the big toe, little toe, and heel.
- Spread the floor with the feet.
- Push the ground away.

VARIATION

- The intensity can be increased by pausing at the bottom of this exercise and performing a three to five second isometric hold between repetitions.


a


b

TRX Split Squat

PURPOSE

To improve lower-body muscular strength and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

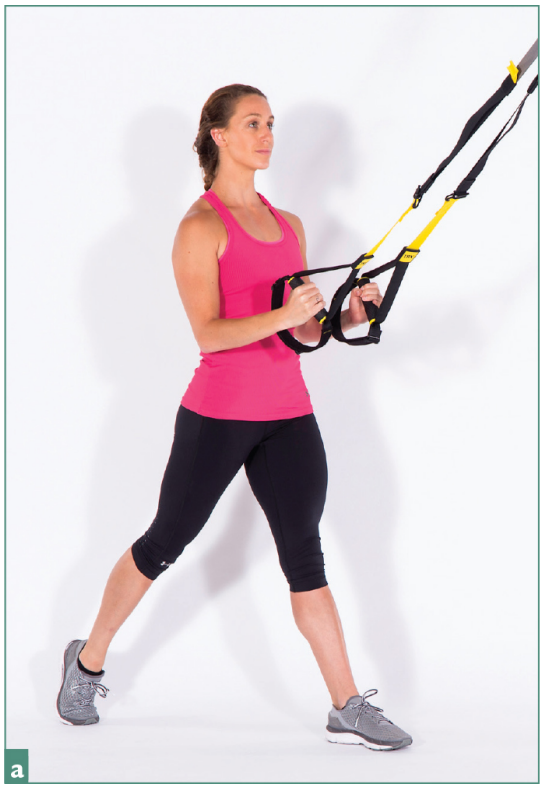
- Stand in a split stance with the toes facing the anchor point. The front foot should be flat on the ground (see figure *a*).
- The heel of the back foot should be up, and the weight should be on the ball of the foot.
- Lower the body by allowing the front knee to flex until the back knee is just above the ground (see figure *b*).
- Push through the front heel, and extend the ankle, knee, and hip to return to the starting position.
- Repeat for the desired number of repetitions, then switch legs and repeat.

TEACHING CUES

- Drop the back knee straight down.
- Drive off the lead foot.
- Keep equal distribution between both feet and your shoulders stacked over the hips.
- Push the ground away.

VARIATION

- The intensity can be increased by pausing at the bottom of this exercise and performing a three to five second isometric hold between repetitions.


a


b

TRX Overhead Squat

PURPOSE

To improve ankle, knee, and hip mobility, as well as lower-body muscular strength and endurance. This exercise also strengthens the muscles of the upper back.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, extend the arms overhead, and step back until there is no slack in the straps.

DESCRIPTION

- Point the toes outward slightly (see figure *a*).
- Squat until the knees are flexed to more than 90 degrees. The knees should remain behind, or directly over, the toes (see figure *b*).
- Extend the hips, knees, and ankles, and return to the starting position.

TEACHING CUES

- Imagine standing in the center of a square and drop the buttocks to the middle of the square.
- Squeeze the shoulder blades together.
- Spread the floor.
- Push the ground away.

VARIATION

- Performing a single-leg version increases the balance, stability, and strength demands of this exercise.


a


b

TRX Front Squat

PURPOSE

To develop lower-body muscular strength and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Stand facing away from the anchor point. Grasp the handles and place the straps under the arms. Walk away from the anchor point until there is no slack in the straps, the elbows are bent, and the handles are directly under the armpits.

DESCRIPTION

- Begin with the feet in full contact with the ground and the weight evenly distributed between the balls of the feet. Step back toward the anchor point until your body is at about a 45-degree angle in relation to the floor (see figure *a*). Lean into the hands.
- Simultaneously flex the ankles, knees, and hips until the knees are flexed to a 90- to 120-degree angle (see figure *b*). Repeat for the desired number of repetitions.

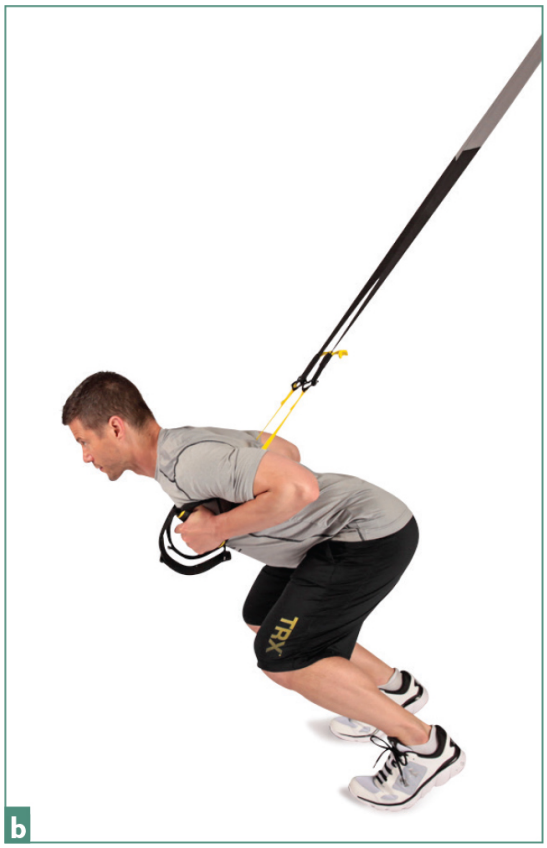
TEACHING CUES

- Maintain a big chest position.
- Brace the trunk.
- Push the ground away.

VARIATIONS

- To increase the intensity of this exercise a single-leg variation can be used.
- A weighted vest can be added to increase the amount of resistance.


TRX
a


TRX
b

TRX Lunge

PURPOSE

To develop lower-body muscular strength and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps (see figure *a*).

DESCRIPTION

- Simultaneously flex the hip, knee, and ankle on the standing leg, and step back with the free foot (see figure *b*). Bend the back knee to 90 degrees. Once the lead-leg thigh is approximately parallel to the ground, return to the starting position.
- Perform for the desired number of repetitions, then switch legs.

TEACHING CUES

- Keep the trunk braced and maintain a big chest position.
- Keep the ankles, knees, and hips aligned.
- Pretend there are flashlights on the hips and shine the lights straight ahead.

VARIATION

- To increase the balance and stability demands of this exercise, drive the rear knee forward while extending the knee and hip of the lead leg. The ankle of the front leg should remain in a cast position (see figures *c-d)*


TRX
a


TRX
b


c


d

TRX Sprinter Start

PURPOSE

To develop balance and knee drive.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Stand facing away from the anchor point. Grasp the handles and place the straps under the arms. Walk away from the anchor point until there is no slack in the straps, the elbows are bent, and the handles are directly under the armpits.

DESCRIPTION

- Assume a staggered stance and position the majority of the weight on the balls of the feet.
- While maintaining a cast (i.e., dorsiflexed) ankle, drive the back knee forward (see figure). Hold this position for a 2 count as you balance on the ball of the front foot (full extension of front hip and knee).
- Return to the starting position, then repeat for the desired number of repetitions.

TEACHING CUES

- “Heel up” when driving the knee forward.
- Brace the trunk.

VARIATION

- A weighted vest can be added to increase the amount of resistance.


TRX

TRX Single-Leg Squat

PURPOSE

To develop lower-body strength, endurance, stability, and mobility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand on one foot while facing the anchor point (see figure *a*). Grasp the handles, bend the elbows, align the upper arms just behind the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Squat and extend the free leg out in front (see figure *b*).
- Return to the starting position, and repeat for the desired number of repetitions, then switch and perform the same number of repetitions on the opposite leg.

TEACHING CUES

- Brace the trunk.
- Keep the shoulders stacked over the hips. The standing knee should not go beyond the standing toes.
- “Shoot the duck.”
- Push the ground away.

VARIATIONS

- A weighted vest can be added to increase the intensity of this exercise.
- Performing combination movements, such as a pistol squat followed by a reverse lunge, can add additional variety and challenge to a workout routine.


a


b

TRX Lateral Squat

PURPOSE

To improve ankle, knee, and hip mobility, as well as lower-body muscular endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Position the feet wider than shoulder width and facing forward, with the heels in line with middle toes and in contact with the ground (see figure *a*).
- Keep both feet in position and shift the body weight to one side while flexing the knee and pushing the hips back. At this point, the same-side glute and shoulder should be directly aligned with the heel (see figure *b*).
- The lead knee should be at 90 degrees, and the nonsquatting leg should be fully extended at the side.
- Push off the lead foot, return to the starting position, and then shift the weight to the opposite leg.

TEACHING CUES

- Keep the big toe, little toe, and heel in contact with the ground at all times.
- Keep the lead ankle, knee, and hip aligned.
- Push the ground away.

VARIATION

- The intensity can be increased by pausing at the bottom of this exercise and performing a three to five second isometric hold between repetitions.


a


b

TRX Lateral Lunge

PURPOSE

To improve ankle, knee, and hip mobility, as well as lower-body muscular endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Position the feet together (see figure *a*).
- Step one foot to the side so that the feet are slightly wider than shoulder width. The heel of the stepping-leg foot should be in full contact with the ground.
- Shift the body weight toward the stepping leg, flex the knee, and drop the hips. At this point, the same-side glute and shoulder should be directly aligned with the heel of the stepping-leg foot (see figure *b*).
- The stepping-leg knee should be at 90 degrees, and the nonworking leg should be fully extended at the side.
- Push off the stepping-leg foot and return to the starting position; then, step to the opposite side and repeat.

TEACHING CUES

- Make certain the big toe, little toe, and heel on the lead leg are in contact with the ground before descending into the lunge position.
- Keep the ankles, knees, and hips aligned.
- Push the ground away.


a


b

TRX Suspended Reverse Lunge

PURPOSE

To improve lower-body muscular endurance and coordination.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf.

STARTING POSITION

Stand facing away from the anchor point, place one foot in both foot cradles, and place the hands by the hips (see figure *a*).

DESCRIPTION

- While maintaining a rigid torso, flex both knees until the lead-leg thigh is parallel to the ground (see figure *b*).
- Extend the lead leg and bring the back foot forward until back in the starting position, then repeat with the other leg.

TEACHING CUES

- Keep the lead knee aligned with the second toe of lead foot.
- Keep a vertical active plank.
- Keep equal weight in both feet and be sure to bend both knees.

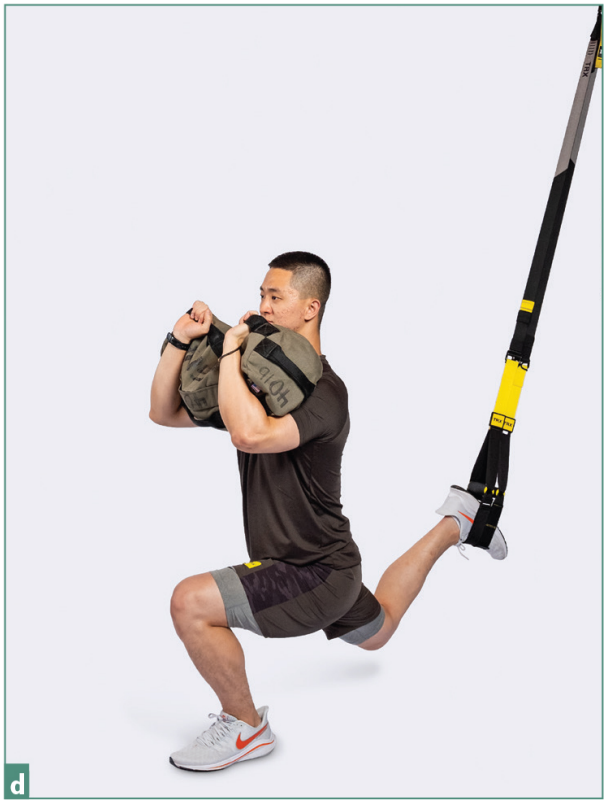
VARIATIONS

- The intensity of this exercise can be increased by grasping a weight (e.g., dumbbell, kettlebell, or sandbag) in the hand opposite the stance leg similar to a suitcase (see figures *c* and *d*).
- The intensity of this exercise can also be increased by holding a medicine ball. Drive up on the lead leg as if pushing the ground away.


a


b


c


d

TRX Crossing Lunge

PURPOSE

To develop balance, hip stability, strength, and endurance on a single leg.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

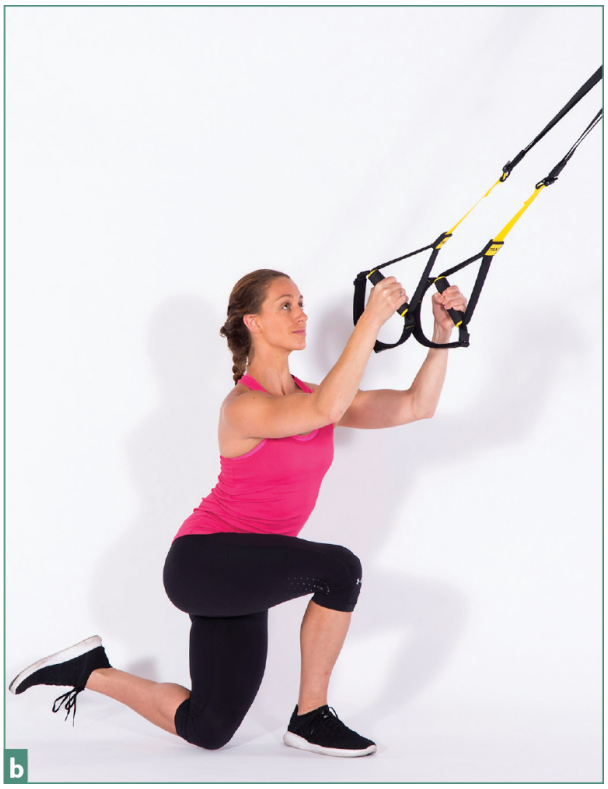
DESCRIPTION

- Stand on the right leg with the right foot in full contact with the ground and the left foot about three inches (8 cm) off the ground (see figure *a*).
- Flex the right leg until the thigh is at a 110- to 130-degree angle, then cross your left leg behind the right leg toward the 4 o'clock position. Bend your left knee to the outside of your right heel (see figure *b*).
- Repeat for the desired number of repetitions then switch legs.

TEACHING CUES

- Keep the ankle, knee, and hip on the working leg aligned.
- Bend the back knee and extend the back leg as far as possible while maintaining balance and proper body alignment.


a


b

TRX Angled Lunge

PURPOSE

To develop lower-body muscular strength and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf.

STARTING POSITION

Stand side facing the anchor point, lift the leg furthest from the anchor point, and balance on the leg closest to the anchor point.

DESCRIPTION

- Loop the arm closest to the anchor point through the foot cradles, grasp the hands together, and hold them close to the chest. Lean away from the anchor point so that the torso is at a 30- to 45-degree angle to the ground (see figure *a*).
- While keeping the torso rigid, squat on the balance leg and drop the knee on the leg furthest from the anchor point toward the ground (see figure *b*).
- Perform for the desired number of repetitions, turn 180 degrees, and repeat using the opposite leg.

TEACHING CUES

- Keep the majority of the weight on the inner-edge of the working-leg foot.
- Make certain the ankle, knees, and hips remain aligned throughout the exercise.


a


b

TRX Drop Squat

PURPOSE

To develop eccentric strength and stability while learning proper landing mechanics.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Stand tall with the feet hip-width apart (see figure *a*).
- Rise up on the toes, and then rapidly split the feet to the side and land in the universal athletic position with the chest up, shoulders back, and slightly flexed ankles, knees, and hips (see figure *b*).
- Land quietly in a squat position (see figure *c*).
- Rise to return to the starting position.

TEACHING CUES

- Make certain the ankles, knees, and hips remain aligned throughout the duration of the exercise.
- Land with the knees just behind the toes and with both feet in full contact with the ground.
- Land as quietly as possible.
- Stick the landing.

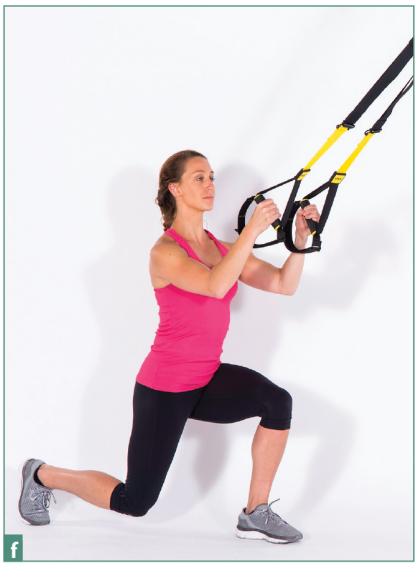
VARIATIONS

- This drill can be progressed to several single-leg variations, such as the drop split squat (see figures *d-f*) or rear foot-elevated drop squat (see figures *g-i*).


a
b
c


d


e


f


g


h


i

TRX Suspended Overhead Lunge

PURPOSE

To improve lower-body strength and muscular endurance, and trunk stability.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Stand facing away from the anchor point. Place one foot in both foot cradles and adjust the position until the straps are roughly perpendicular to the ground. Grasp a medicine ball and hold it overhead.

DESCRIPTION

- Push the suspended foot back until the feet are in a staggered position; the toes should face straight ahead, and the lead foot should be flat on the ground (see figure *a*).
- Lower the body by flexing the front knee until it is at 90 degrees and the thigh is parallel to the ground; keep the arms fully extended and the medicine ball overhead throughout the duration of the movement (see figure *b*).
- Push through the front heel and extend the knee and hip to return to the starting position.
- Repeat for the desired number of repetitions, then switch legs and repeat.

TEACHING CUES

- Drop the back knee straight down.
- Drive off the lead foot.
- Push the ground away.
- Maintain a vertical active plank throughout the exercise.
- Keep the upper arms lined up with the ears.
- Make certain the ankle, knees, and hips remain aligned throughout the exercise.


a


b

TRX Squat Jump

PURPOSE

To develop concentric power of the lower body and proper landing mechanics.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point with the feet about hip-width apart. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Flex the hips, knees, and ankles, and lower the body into a half-squat position (see figure *a*).
- Before coming to a complete stop, extend the knees and hips, jumping as high as possible off both feet (see figure *b*).
- Land in the takeoff position (see figure *c*).
- Hold this position for two or three seconds, then perform the next jump.

TEACHING CUES

- Take off like a rocket.
- Land quietly.


a
b
c

TRX Countermovement Jump to Stick

PURPOSE

To develop lower-body power and proper landing mechanics.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point with the feet about hip-width apart. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Flex the hips, knees, and ankles, and lower the body into a full squat (see figure *a*).
- Before coming to a complete stop, extend the knees and hips and jump as high as possible off both feet (see figure *b*).
- Land quietly in the takeoff position and stick the landing (see figure *c*).

TEACHING CUES

- Take off like a rocket.
- Land quietly.

VARIATIONS

- This drill can be progressed by performing repeat countermovement jumps, in which the individual attempts to minimize ground contact time between repetitions (i.e., no rest between jumps).
- A weighted vest can also be added to this drill to increase the intensity of each jump.


a
b
c

TRX Split Squat Jump to Stick

PURPOSE

To develop eccentric strength and proper landing mechanics.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- Stagger the feet in a lunge position with the toes facing straight ahead (see figure *a*). The front foot should be flat on the ground. The heel of the back foot should be up, and the weight should be on the ball of the foot.
- Drop rapidly by flexing the front knee until it reaches 100 to 120 degrees (see figure *b*).
- Push through the front heel, and extend the ankles, knees, and hips to jump as high as possible (see figure *c*).
- Land quietly in the starting position and stick the landing.
- Repeat for the desired number of repetitions, then switch legs and repeat.

TEACHING CUES

- Land as quietly as possible.
- Take off like a rocket.

VARIATIONS

- This drill can be progressed by performing repeat countermovement jumps, in which the individual attempts to minimize ground contact time between repetitions (i.e., no rest between jumps).
- A weighted vest can also be added to this drill to increase the intensity of each jump.


a
b
c

TRX Alternated Split Squat Jump to Stick

PURPOSE

To learn proper landing mechanics and improve lower-body coordination.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

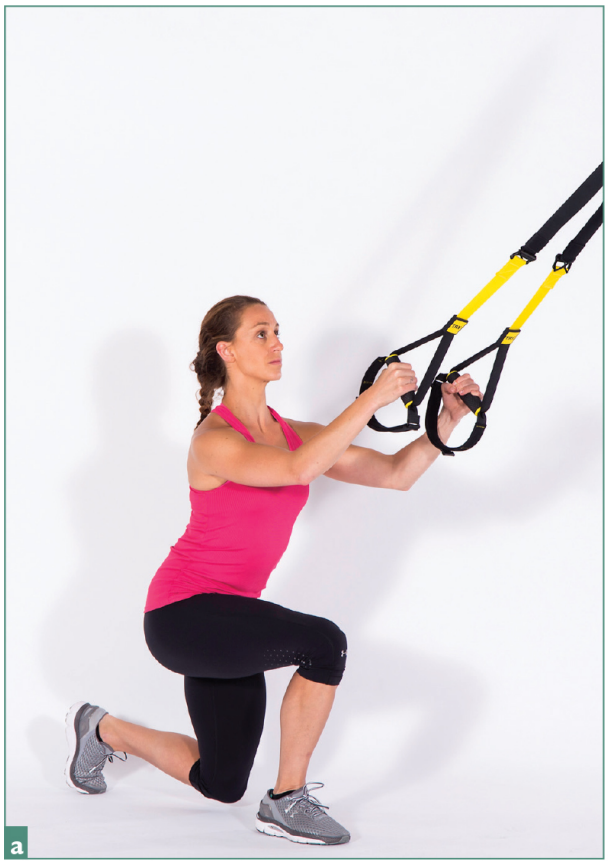
- Stagger the feet in a lunge position with the toes facing straight ahead. The front foot should be flat on the ground. The heel of the back foot should be up, and the weight should be on the ball of the foot.
- Quickly perform a small countermovement by flexing the front knee until it reaches 90 degrees (see figure *a*).
- Immediately push through the front heel. Extend the ankles, knees, and hips, and jump as high as possible (see figure *b*).
- At the top of the jump, rapidly scissor the legs so that they switch positions (see figure *c*).
- Land quietly and stick the landing (see figure *d*).
- Repeat for the desired number of repetitions, switching legs with each jump.

TEACHING CUES

- Land quietly.
- Take off like a rocket.
- Keep a vertical active plank.

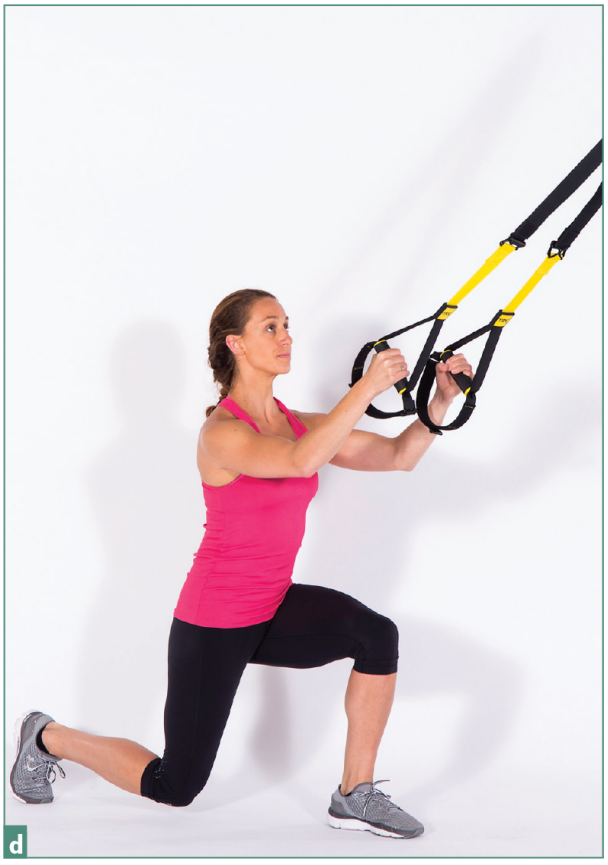
VARIATION

- This drill can be progressed by performing repeated jumps, in which the individual attempts to minimize ground contact time between repetitions (i.e., no rest between jumps).


a


b


c


d

TRX Lateral Skater with Stick

PURPOSE

To develop concentric power of the lower body, as well as knee and hip stability.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Stand facing the anchor point with the feet about hip-width apart. Grasp the handles, bend the elbows, align the upper arms by the waist with the palms facing one another, and step back until there is no slack in the straps.

DESCRIPTION

- With the feet hip-width apart, shift the weight to the left foot while lifting the right leg and bringing it behind the left leg (see figure *a*).
- Drive the right leg laterally, jumping to the right and landing on the right foot, with the left leg flexed and crossing behind the right leg (see figure *b*).
- Stick the landing, pause for one or two seconds, and then bound back to the left side and stick the landing on the left foot.

TEACHING CUES

- Keep the weight evenly distributed between the big toe, baby toe, and center of the standing heel.
- Keep the standing knee in line with the second toe of the standing foot.
- Land as quietly as possible.
- Keep a vertical active plank.

VARIATION

- This drill can be progressed by performing repeated jumps, in which the individual attempts to minimize ground contact time between repetitions (i.e., no rest between jumps).


a


b

TRX Single-Leg Knee Extension

PURPOSE

To develop quadriceps strength and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Begin on the ground facing away from the anchor point and place one foot in both foot cradles. Come up onto the hands and knees and place the hands directly under the shoulders. Lift up into a plank position. Once this has been accomplished, flex the knees and the hips to 90-degree angles (see figure *a*).

DESCRIPTION

- Extend the legs and lift the hips so that the hips are stacked over the shoulders (see figure *b*).
- Slowly flex the knees and lower back down to the starting position.

TEACHING CUES

- Maintain an active plank throughout the exercise.
- Push the hips and the glutes toward the ceiling.


TRX
a


TRX
b

TRX Calf Raise

PURPOSE

To develop the muscles on the posterior side of the lower leg.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length

STARTING POSITION

Stand facing away from the anchor point. Grasp the handles, wrap the straps under the arms bending the elbows in toward the sides, and step forward until there is no slack in the straps and the handles are directly under the armpits.

DESCRIPTION

- Begin with the feet in full contact with the ground and the weight evenly distributed between the big toe and the little toe (see figure *a*).
- Lift the heels and rise up on the toes (see figure *b*).
- Lower the heels to the ground and repeat for the desired number of repetitions.

TEACHING CUES

- Stand tall and maintain an active plank.
- Pause at the top for a count of 2.

VARIATIONS

- To increase the intensity of this exercise a single-leg variation can be used (see figure *c*).
- A weighted vest can also be added to safely increase the amount of resistance.


a
b
c

TRX Suspended Single-Leg Deadlift

PURPOSE

To improve lower-body strength and muscular endurance, and trunk stability.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Stand facing away from the anchor point. Place one foot in both foot cradles and adjust the position until the straps are at a 110- to 130-degree angle to the ground. Grasp a pair of sandbags or kettlebells and hold them at either side of the lead leg (see figure *a*).

DESCRIPTION

- Lower the body by allowing the front knee to flex until it is at 90 degrees and the thigh is parallel to the ground (see figure *b*).
- Simultaneously push the suspended foot back.
- Push through the front heel and extend the knee and hip to return to the starting position.
- Repeat for the desired number of repetitions, then switch legs and repeat.

TEACHING CUES

- Drive off the lead foot.
- Push the ground away.
- Maintain an active plank throughout the exercise.


a


b

TRX Hamstring Curl

PURPOSE

To develop hamstring strength and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

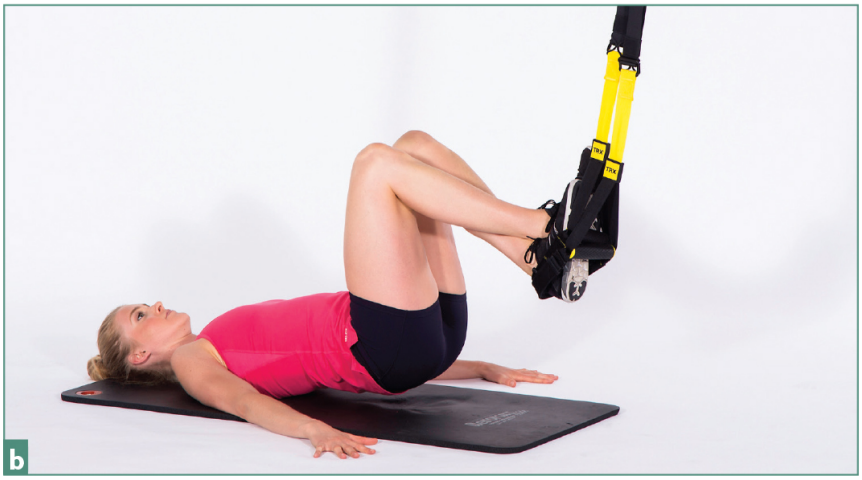
Begin on the ground with the heel of one foot in the foot cradles. Place the hands to the sides of the torso with the palms down.

DESCRIPTION

- Extend the legs and lift the hips so that the trunk, legs, and shoulders are aligned (see figure *a*). Position the lower legs and feet next to each other.
- Slowly flex at the hips and the knees while pulling the heels toward the buttocks (see figure *b*). The hips should drop down to touch the ground when flexing the knees.
- Extend the hips and knees and return to the starting position.
- To make this exercise more challenging, do not allow the hips to flex; rather, flex only at the knees. Note: the number of sets and repetitions should be equalized between limbs (i.e., sets × repetitions).

TEACHING CUES

- Brace the core.
- Keep the knees unlocked when legs are fully extended.
- Keep in mind that control is more important than speed.
- Squeeze the hamstrings at the top of the movement.



VARIATIONS

- Performing the exercise using a single leg can be used to increase the demands of this exercise (see figures *c*-*d*). The intensity of this drill can also be increased by keeping the hip extended throughout the duration of the exercise (see figure *e*). Additionally, slowing the movement speed when extending the legs increases the difficulty of this exercise by increasing the time the hamstrings are under tension.

CHAPTER 7

Core Exercises

Most of us have heard the parable about the builders that chose to construct their house on sand rather than solid rock. Similarly, if we build fitness and performance on a poor foundation, it decreases the opportunity for success and increases the risk of injury. Developing effective and efficient movement patterns is a complex process that requires the muscles to work in concert to produce, reduce, and stabilize forces. Quality movement is predicated on the ability to stabilize certain body segments and facilitate more efficient movements at others. Developing the muscles of the trunk, or core, stabilizes the spine against loading forces and creates a solid platform, or anchor point, for movement at the joints.

This chapter presents exercises for developing the trunk. Many can be used to establish a proper foundation of stability and mobility for the more advanced upper- and lower-body exercises in chapters 5 and 6. The exercises in this section have been categorized into three main areas: front core, back core, and side core. The front core exercises place a greater emphasis on the anterior muscles of the trunk, such as the rectus abdominis and transverse abdominis; the back core exercises emphasize the muscles of the lower back and glutes; and the side core exercises focus primarily on the obliques.

CORE

FRONT CORE EXERCISES

TRX Cobra Stretch

PURPOSE

To stretch the anterior core (i.e., rectus abdominis and hip flexors).

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Face away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart. Set the body in a straight line, or plank position.

DESCRIPTION

- Brace the trunk and keep the arms straight while pulling the shoulder blades down and together.
- Drop the hips toward the ground, stretching the rectus abdominis and hip flexors until mild tension is felt in these areas (see figure).
- Lift the hips and return the starting position.

TEACHING CUES

- Stretch to the point of mild tension.
- Do not stretch to the point of pain.


TRX

TRX Standing Plank

PURPOSE

To develop trunk stability and endurance.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

Face away from the anchor point and grab a handle with each hand. Position the hands shoulder-width apart.

DESCRIPTION

- Set the body in a straight line. Brace the trunk, keep the arms straight, and slowly step back until there is tension on the straps and the body is at an incline.
- Simultaneously pull the shoulder blades down and together (see figure).
- While keeping the arms straight, attempt to hold this position for 30 to 60 seconds.

TEACHING CUES

- Put the edges of the scapulae in the back hip pockets.
- Stay stiff as a board from the head to heels.

VARIATIONS

- To increase the balance and stabilization demands of this exercise raise one foot off the ground.
- This variation can then be further progressed by marching in place.

TRX Assisted Pike

PURPOSE

To develop the anterior muscles of the core.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Sit on the ground with the legs fully extended, facing toward the anchor point. Place the hands in the foot cradles and fully extend the arms.

DESCRIPTION

- Brace the trunk; keep the arms straight and lean back so that the feet are approximately three to six inches (8 to 15 cm) off the ground with the head slightly tucked (see figure *a*). Only the buttocks, back, and shoulder blades should be in contact with the ground. While keeping the legs straight, simultaneously lift both legs and, keeping the arms straight, reach toward the feet (see figure *b*).

TEACHING CUES

- Make a V with the upper and lower body.
- Breathe out as you reach toward the feet.

VARIATION

- To add more complexity to this exercise, alternate the leg lifts similar to a bicycle crunch (see figure *c*).


a


b


c

TRX Forearm Plank

PURPOSE

To develop trunk stability and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie face down with the forearms on the ground, facing away from the anchor point. Place the feet in the foot cradles.

DESCRIPTION

- In one continuous movement, lift the hips and torso until the elbows are directly under the shoulders and the upper arms are perpendicular to the ground (see figure *a*).
- Attempt to hold this position for 30 to 60 seconds.

TEACHING CUES

- Put the edges of the scapulae in the back hip pocket.
- Stay stiff as a board from the head to heels.

VARIATION

- The extended arm plank is a variation of this exercise that increases the stress placed on the trunk and muscles surrounding the shoulders (see figure *b*).

a

b

TRX Walking Plank

PURPOSE

To develop shoulder and trunk stability.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie face down with the forearms on the ground, facing away from the anchor point. Place the feet in the foot cradles (see figure *a*).

DESCRIPTION

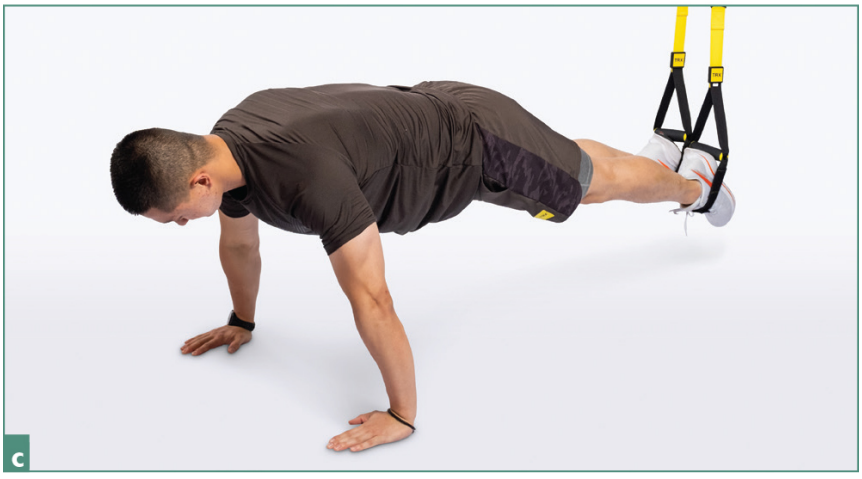
- Shift the body toward the left forearm and place the right palm on the ground, then extend the right arm (see figure *b*). Next, shift the body to the right, place the left hand on the ground and extend the left arm (i.e., the TRX push-up position) (see figure *c*). Return to the starting position by placing the right forearm down, followed by the left forearm.

TEACHING CUES

- Stay stiff as a board from the head to heels.
- Maintain a rhythmic cadence (e.g., 1 = left palm down, 2 = right palm down, 3 = left forearm down, 4 = right forearm down).


a


b


c

TRX Sprinter Plank

PURPOSE

To develop hip and trunk stability and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Face away from the anchor point, and place one foot in both foot cradles. Place the hands on the ground shoulder-width apart.

DESCRIPTION

- Set the body in a straight line, brace the trunk, and keep the arms straight (see figure *a*).
- Simultaneously pull the shoulder blades down and together.
- While keeping the arms and torso straight, drive the free knee up toward the chest until the knee and hip are at 90-degree angles (see figure *b*). The ankle should remain flexed.
- Hold this position for 15 to 30 seconds, then repeat on the opposite side.

TEACHING CUES

- Put the edges of the scapulae in the back hip pockets.
- Stay stiff as a board from the head to heels.
- Keep the toe up, heel up, and knee up on the free leg.
- Drive the free-leg knee toward the chest.


a


b

TRX Crunch

PURPOSE

To develop muscular endurance and stability of the trunk.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Face away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart.

DESCRIPTION

- Set the body in a straight line, or plank position, brace the trunk, and keep the arms straight (see figure *a*).
- Pull the shoulder blades down and together while pulling both knees toward the chest (see figure *b*).
- Return to the starting position and continue this movement for the desired number of repetitions.

TEACHING CUES

- Brace the core first, then drive the knees toward the chest.
- Control the movement. Perform at an even tempo (e.g., a count of 2 for the crunch and a count of 2 to return to the fully extended position).


a


b

TRX Mountain Climbers

PURPOSE

To develop muscular endurance and stability of the trunk.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Face away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart.

DESCRIPTION

- Set the body in a straight line, or plank position, brace the trunk, and keep the arms straight (see figure *a*).
- Simultaneously pull the shoulder blades down and together and bring the right knee up toward the chest (see figure *b*).
- While the right leg returns to the starting position, bring the left leg toward the chest in the same manner.
- Continue this movement, alternating between right and left sides as if pedaling a bike.

TEACHING CUES

- Brace the core first, then drive the knee toward the chest.
- Control the movement. Perform at an even tempo (e.g., a count of 2 for the crunch and a count of 2 to return to the fully extended position).


a


b

TRX Kneeling Rollout

PURPOSE

To develop muscular endurance, eccentric strength, and stability of the trunk.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

Kneel facing the anchor point and grasp the handles with an overhand, shoulder-width grip. Back up until the straps are at a 45-degree angle.

DESCRIPTION

- Pull the toes back toward the shins (see figure *a*). While keeping the knees and toes fixed on the ground, arms taut, and torso stiff, lean forward as far as possible without touching the ground (see figure *b*).
- Return to the starting position by contracting the abdominal muscles, and then return along the same path to the starting position.
- Perform the desired number of repetitions.

TEACHING CUES

- Keep the back flat.
- Brace the trunk.
- Control the movement. Use an even tempo during the lowering phase and on the return to the starting position.

VARIATION

- The standing rollout is an advanced progression of the kneeling rollout (see figures *c*-*d*). This variation increases the intensity of the kneeling rollout by lengthening the lever arm and increasing the distance of the center of mass from the fulcrum (i.e., feet vs. knees).


a


b


c


d

TRX Pike

PURPOSE

To develop muscular endurance, mobility, and stability of the trunk, as well as improve hamstring flexibility.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Face away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart.

DESCRIPTION

- Set the body in a straight line, or plank position, brace the trunk, and keep the arms straight (see figure *a*).
- Simultaneously pull the shoulder blades down and together while flexing the hips and pushing the buttocks up. Keep the legs completely straight while bringing the feet toward the chest (see figure *b*).
- At the end of the movement, the shoulders and back should be as close to perpendicular to the ground as possible.
- Return to the starting position and repeat for the desired number of repetitions.

TEACHING CUES

- Brace the core before moving the lower body.
- Control the movement. Use an even tempo when lifting the knees and returning to the starting position.
- Place the head between the upper arms and push the buttocks to the ceiling.


a


b

TRX Hip Press

PURPOSE

To develop hip and trunk stability, strength, and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie faceup and place the heels in the foot cradles. The hands should be next to the sides of the torso with the palms down (see figure *a*).

DESCRIPTION

- Begin with one heel in each stirrup. Flex the knees and the hips at a 90-degree angle and lift the hips off the ground (see figure *b*).
- Hold this position for 30 to 60 seconds.
- For an added challenge, slowly lower the hips until they are one inch (2.5 cm) from the ground, then return to the starting position. Repeat for the desired number of sets and repetitions.

TEACHING CUES

- Squeeze the glutes.
- Brace the trunk as if readying for a punch to the abdomen.


TRX
TRX
a


TRX
TRX
b

TRX Reverse Plank

PURPOSE

To develop trunk and shoulder stability, mobility, and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

From a seated position, place the heels in the foot cradles with the arms extended to the sides and the hands in contact with the ground.

DESCRIPTION

- Walk the hands back until the shoulders are in a hyperextended position (see figure *a*).
- Extend the legs and lift the hips so that the trunk, legs, and shoulders are aligned (see figure *b*).
- Hold this position for 30 to 60 seconds.
- For an added challenge, slowly lower the hips until they are one inch (2.5 cm) from the ground, then return to the starting position. Perform 10 to 12 repetitions for the desired number of sets.

TEACHING CUES

- Squeeze the glutes.
- Brace the trunk as if readying for a punch to the abdomen.


a


b

TRX Supine Plank

PURPOSE

To develop hip and trunk stability, strength, and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Lie faceup and place the heels in the foot cradles. Place the hands next to the sides of the torso with the palms down.

DESCRIPTION

- Extend the legs and lift the hips so that the trunk, legs, and shoulders are aligned (see figure).
- Hold this position for 30 to 60 seconds.
- For an added challenge, slowly lower the hips until they are one inch (2.5 cm) from the ground, then return to the starting position. Repeat for 10 to 12 repetitions and for the desired number of sets.

TEACHING CUES

- Squeeze the glutes.
- Brace the trunk as if readying for a punch to the abdomen.

CORE

SIDE CORE EXERCISES

TRX Side Plank

PURPOSE

To develop trunk and hip stability and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Face away from the anchor point and place the feet in the foot cradles.

DESCRIPTION

- Lie on the right side with the right forearm in contact with the ground, the elbow directly under the shoulder, and the right foot behind the left.
- Place the left hand on the left hip, and then lift the hips until the torso is parallel to the ground (see figure *a*).

TEACHING CUES

- Put the edges of the scapulae in the back hip pockets.
- Stay stiff as a board from the head to heels.

VARIATIONS

- To increase the difficulty of this exercise perform a side plank with the arm fully extended (see figure *b*). Hold this position for the desired amount of time, and then repeat on the opposite side.
- The rotational side plank is a more complex variation of the traditional side plank. This variation further increases the demands for balance, stability, and coordination to stabilize and control movement (see figures *c* and *d*).


a


b


c


d

TRX Oblique Crunch

PURPOSE

To develop muscular endurance, mobility, and stability of the trunk.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-calf length.

STARTING POSITION

Face away from the anchor point and place the feet in the foot cradles. Place the hands on the ground shoulder-width apart.

DESCRIPTION

- Set the body in a straight line, or plank position, brace the trunk, and keep the arms straight (see figure *a*).
- Simultaneously pull the shoulder blades down and together and bring the right knee up toward the left shoulder (see figure *b*).
- While the right leg returns to the starting position, bring the left leg toward the right shoulder in the same manner, then return to the starting position.

TEACHING CUES

- Brace the core before moving the lower body.
- Control the movement. Use an even tempo when lifting the knees and returning to the starting position.


a


b

TRX Resisted Torso Rotation

PURPOSE

To develop muscular endurance, eccentric strength, mobility, and stability of the trunk.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

Face sideways to the anchor point and grasp the handles in both hands using a neutral grip. Stagger the stance so that one foot is closer to the anchor point.

DESCRIPTION

- While keeping the arms slightly flexed, lean laterally until the torso is at a 30- to 45-degree angle to the ground (see figure *a*).
- While keeping the arms locked in the starting position and the torso rigid, rotate the shoulders toward the anchor point (see figure *b*).
- Perform the desired number of repetitions, then repeat turning toward the right.

TEACHING CUES

- Brace the core.
- Pull the strap toward the midline of the body.


TRX
a


TRX
b

TRX Standing Rotation

PURPOSE

To develop muscular endurance, eccentric strength, mobility, and stability of the trunk.

ADJUSTMENT

Fully lengthen the straps of the Suspension Trainer.

STARTING POSITION

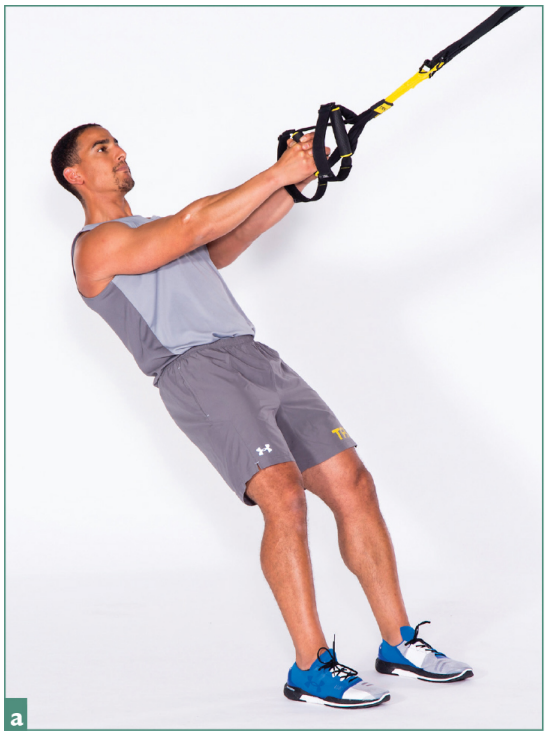
Face the anchor point and grasp the handles in both hands using a neutral grip.

DESCRIPTION

- While keeping the arms slightly flexed, lean back until the torso is at a 45-degree angle to the ground (see figure *a*).
- Pull the shoulder blades together and downward while rotating the torso to the right. Keep the feet planted in the starting position (see figure *b*).
- Perform the desired number of repetitions, then repeat turning toward the left.

TEACHING CUES

- Brace the core.
- Pull the straps toward the midline of the body.


a


b

TRX Power Pull

PURPOSE

To develop muscular endurance, eccentric strength, mobility, and stability of the trunk.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

Face the anchor point, grasp the handles with one hand using a neutral grip, and touch the handle with the palm of the free hand.

DESCRIPTION

- While keeping the arms straight, lean back until the torso is at a 45-degree angle to the ground.
- Rotate the torso toward the free hand side and reach back as far as possible (see figure *a*).
- Pull the strap to bring the working elbow into the rib cage while pivoting on the toes and reaching with the free arm toward the straps (see figure *b*).
- Once balanced, slowly return to the starting position.
- Perform the desired number of repetitions, then repeat turning toward the right.

TEACHING CUES

- Reach for the ground, then reach for the anchor point of the Suspension Trainer.
- Keep the eyes on the lead hand.


a


b

TRX Hip Drop

PURPOSE

To develop muscular endurance, eccentric strength, mobility, and stability of the trunk.

ADJUSTMENT

Fully shorten the straps of the Suspension Trainer.

STARTING POSITION

Face sideways to the anchor point and grasp the handles overhead in both hands using a neutral grip.

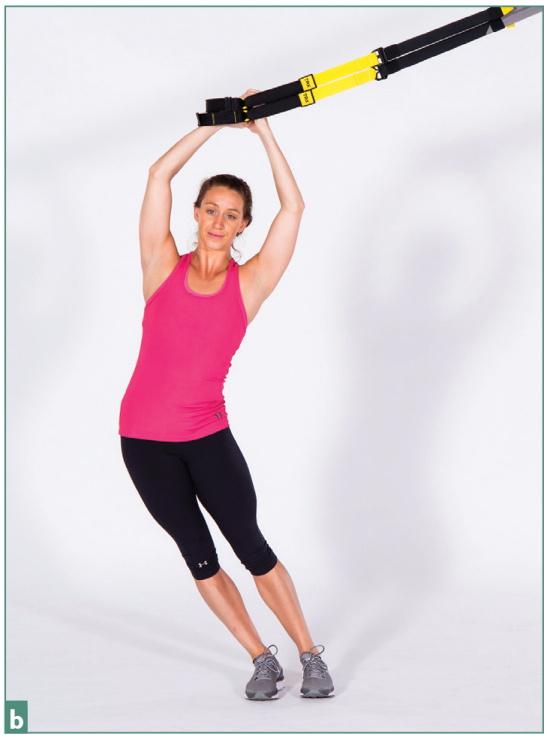
DESCRIPTION

- Facing sideways (see figure *a*), keep the arms slightly flexed and lean away from the anchor point by allowing the trunk to flex laterally toward the anchor point and the hips to shift in the opposite direction (see figure *b*).
- To return to the starting position, contract the obliques on the side furthest from the anchor point until the trunk is in a neutral position.

TEACHING CUES

- On the descent, drop the hips toward the ground.
- On the ascent, push the hips toward the anchor point and the hands toward the ground.


a


b

TRX Pallof Press

PURPOSE

To develop trunk and shoulder stability and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

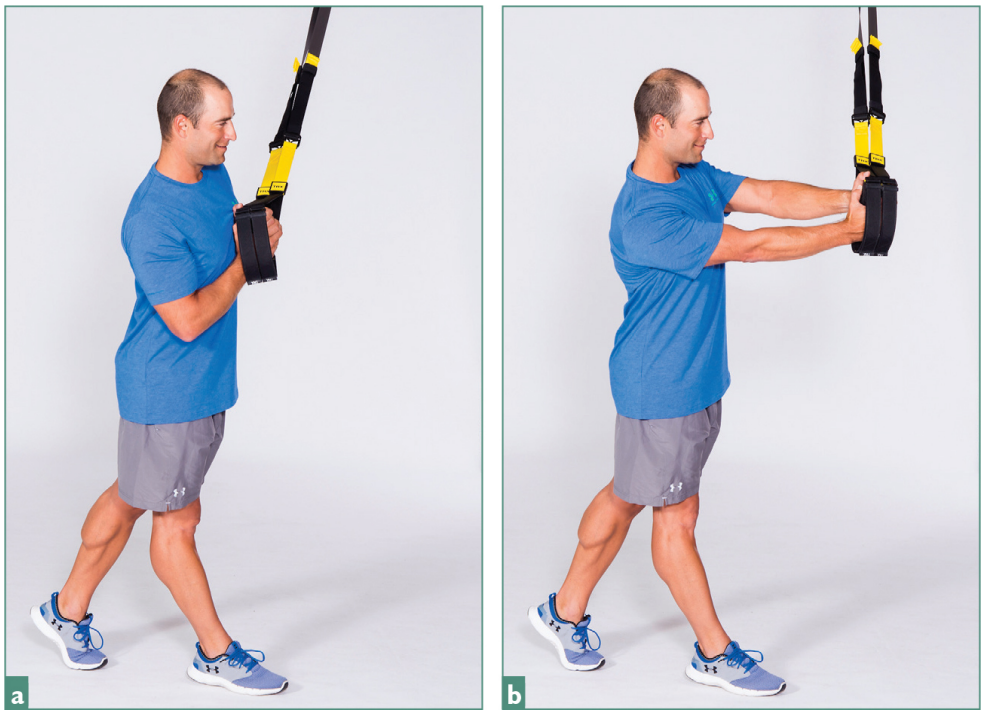
Face to the side of the anchor point and grasp the handles in both hands using a neutral grip.

DESCRIPTION

- Stagger the feet front and back. The foot farther from the anchor point should be the lead foot.
- While keeping the hands close to the chest, lean laterally so that the torso is 30 to 45 degrees from the ground (see figure *a*).
- While keeping the torso rigid, press the hands away from the body and extend the arms (see figure *b*).
- Slowly flex the arms and return to the starting position.
- Perform for the desired number of repetitions, turn 180 degrees, and repeat.

TEACHING CUES

- Squeeze the glutes.
- Brace the trunk as if readying for a punch to the abdomen.
- If unable to fully extend the arms, walk farther from the anchor point to reduce the amount of lean and lighten the resistance, or extend the arms as far as possible and progress over time until able to fully extend the arms (i.e., use a partial to whole range of motion).


a
b

TRX Explosive Row to Pallof Press

PURPOSE

To develop trunk and shoulder stability and endurance.

ADJUSTMENT

Adjust the straps of the Suspension Trainer to mid-length.

STARTING POSITION

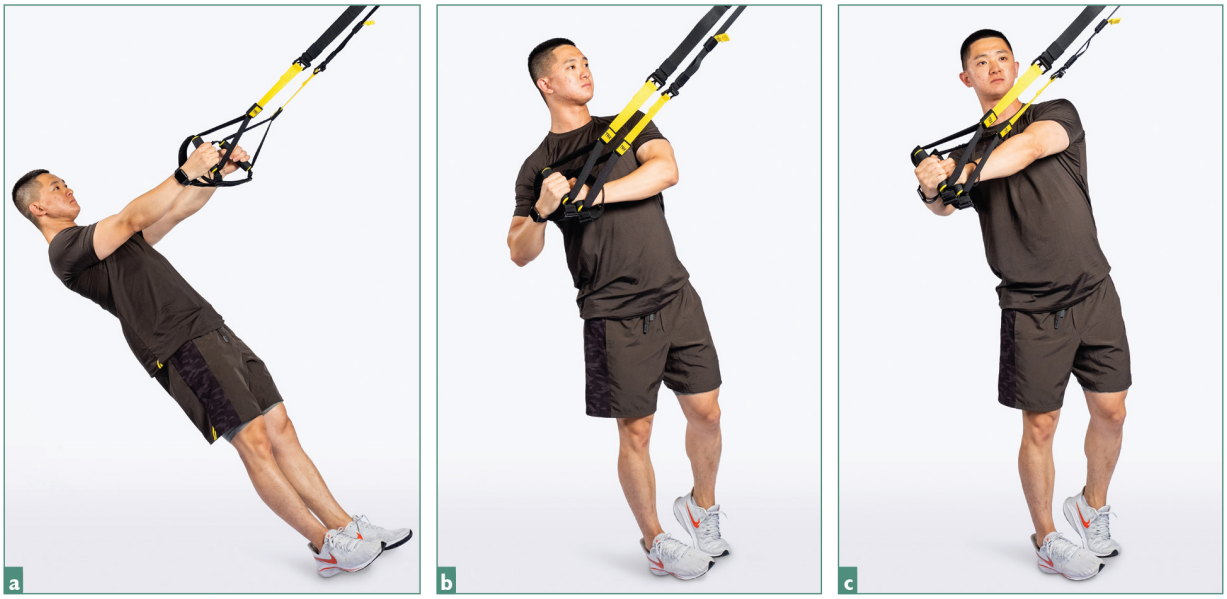
Face the anchor point and grasp the handles in both hands using a neutral grip (see figure *a*).

DESCRIPTION

- Rapidly pull the torso toward the handles (see figure *b*), pivot the hips and feet, then quickly push the handles away from the body (see figure *c*). The foot farther from the anchor point should be the lead foot. Slowly return to the starting position and repeat, pivoting toward the opposite side.

TEACHING CUES

- Squeeze the glutes.
- Brace the trunk as if readying for a punch to the abdomen.
- Punch the hands away from the body.



PART III

TRX Suspension Training Programs

Part III shows how to use the exercises and apply the science covered in parts I and II to develop TRX® Suspension Training® programs. The sample programs can be used as stand-alone modalities or as part of comprehensive strength and conditioning programs that include other forms of resistance training (e.g., barbells, dumbbells, resistance training machines).

CHAPTER 8

Foundations of Program Design

Dumping a bunch of random ingredients into a bowl would be highly unlikely to result in a gourmet meal. Training, too, requires a systematic rather than random approach to maximize results. Excellence does not occur by chance; it requires planning, focused effort, and consistency. This chapter presents the foundations of creating a comprehensive fitness program as well as principles to guide decision making when developing a training plan.

PRINCIPLES OF TRAINING AND CONDITIONING

Regardless of the training goal, six key principles should be followed when developing a training program. Progressive overload, load variation, specificity, individuality, diminishing returns, and reversibility must all be addressed to maximize progress and ensure long-term improvements.

Progressive Overload

Stress is often perceived as a negative experience or state. However, when presented with the right types of stress in the proper amounts, the body can transform in miraculous ways. The principle of progressive overload states that applying a stressor beyond what the body is accustomed to, in a systematic and progressive way, results in an adaptation to the new demands. Too much stress, or stress applied too frequently, may increase injury risk or cause maladaptation. Too little stress, or stress applied too infrequently, will result in no progress or adaptations. For this reason, some

consider the stress induced via exercise to be like medicine: We need the right dose in the right amount to get the best results.

BASICS OF PERIODIZATION

Periodization can be a very confusing topic. To simplify, periodization can be defined as planned changes over time in order to maximize training results. Essentially, periodization is a systematic approach to altering specific training variables that ensure continued progress and minimize overtraining injuries. Of the numerous variations of periodization, this text will focus on the two major types: traditional and undulated.

Traditional Periodization

Traditional periodization, also referred to as classic or linear periodization, uses training blocks that enhance specific physical attributes. Each phase supports the subsequent phase and builds a foundation for progression. These phases consist of the following cycles:

- ***Macrocycle***—A macrocycle is the big picture. Typically, it consists of a full year of training. However, it may also be a four-year cycle for athletes such as Olympians who are looking to peak for Olympic trials or competitions. A macrocycle is made up of a series of mesocycles.
- ***Mesocycle***—A mesocycle is a block of training that generally lasts between six and eight weeks. A mesocycle consists of a series of microcycles.
- ***Microcycle***—A microcycle is typically a one- to two-week block of training. At the beginning of a linear periodization program, the emphasis is generally on improving movement proficiency, improving muscular endurance, and increasing muscle size. During this phase, strength also improves, although this is not the main focus. At this stage, Suspension Training can be used extensively to improve muscular endurance, improve movement quality, and

facilitate rehabilitation. Most beginners experience rapid changes in coordination and strength as a result of a variety of neurological influences (e.g., greater rate coding and synchronization).

After about 6 to 12 weeks of training, the focus starts to shift from increasing general muscular fitness to increasing muscular size and strength. Increasing size increases force-generating capacity by increasing muscle cross-sectional area. In addition, neurological changes occur as a result of lifting heavier loads, allowing for greater loads to be lifted than before. Suspension Training plays a critical role in this phase. Suspension Training exercises can increase the overall density of a training session (i.e., more work in less time), unload muscles and muscle groups to enhance recovery while minimizing losses, and help reduce and minimize potential injury.

The last phase of a linear periodization cycle tends to focus on maximizing strength and power. During this phase, Suspension Training is very useful during the dynamic warm-up to wake up stabilizer muscles while taking the emphasis off the prime movers. During this stage, Suspension Training can be a very effective method of periodically unloading and reducing fatigue that has been accrued via heavy or very intense training. This may also help reduce the stress on the body to minimize the risk of injury and overtraining.

Undulated Periodization

Undulated, or nonlinear, periodization follows a similar pattern to linear periodization, although the training is altered more quickly (i.e., addressing muscular endurance, fitness, strength, and power within a week). For example, a Monday session may focus on muscular endurance; Wednesday, on muscular power; and Friday, on muscle size or strength (or both). Undulated periodization tends to work well for those with more experience and a good training foundation. It also works well for those who may not need to peak for a particular competition or event, but rather want to maintain a level of fitness in all muscle qualities

year round, such as fitness enthusiasts or tactical athletes (e.g., soldiers, firefighters, law enforcement officers).

Load Variation

Progressive overload is paramount to success, but the load applied to the body should not progress in a strictly linear way. People can't lift or train hard all the time. Without some variation in the training cycle, the body cannot realize fitness gains because of the accumulation of fatigue. To realize fitness gains, the body must be allowed to recover. This is one reason for using a periodized strength and conditioning program, which provides small fluctuations in intensity and volume in the short term. In a periodized program, short-term variations occur, but the overall trend is toward increasing fitness.

Numerous forms of periodization can be used to improve health, fitness, and performance. The design selected is based on a variety of factors such as goals, time constraints, and equipment availability. Several forms of periodization, with examples, are presented in the Basics of Periodization sidebar.

Specificity

In the most simplistic terms, the specificity principle states that you get what you train for. This relates to improving the quality of specific muscles (e.g., quadriceps, biceps), overall muscle qualities (e.g., endurance, size, strength, power), movements (e.g., pushing, pulling, squatting), muscle actions (i.e., concentric, eccentric, isometric), and conditioning (i.e., anaerobic or aerobic). Receiving the greatest benefit from a training program requires setting goals and then determining which variables to consider to reach those goals.

One critical aspect of specificity that is often overlooked is that some exercises look nothing like the movements they improve. For example, lying faceup and performing a hip bridge looks nothing like high-speed running. However, this exercise is excellent for strengthening the glutes and the muscles surrounding the hips, which may contribute to greater stability on the stance leg during gait, a reduced risk of injury from biomechanical inefficiencies, and better force production at ground contact. Because this

exercise isolates muscles that may contribute to improved performance, it is deemed functional for improving running speed. Specificity does not mean mimicry. Some exercises develop the parts that contribute to improving the whole.

Individuality

Although for the most part we are fairly similar physiologically, we respond to training programs differently based on our fitness levels, genetics, and anthropometrics (e.g., body size, limb and torso length). A beginner who takes part in a training program designed for an elite athlete may very well overtrain. Similarly, an advanced athlete in a beginner's program would likely detrain and experience reductions in performance.

Tall people may experience less increases in muscle size than shorter people because longer limbs, or levers, tend to favor speed, whereas shorter levers tend to favor strength. Additionally, when performing a push-up, someone with longer arms has to do more mechanical work than someone with shorter arms because of the need to cover a greater distance to perform the same task. The shorter person may appear to increase muscle size to a greater extent, whereas the taller person may accrue just as much lean mass, but it may look less bulky because of the length of the muscle. Although a training program may affect some factors, some are genetic and cannot be altered.

Diminishing Returns

Someone new to exercise can generally take part in any training program for six to eight weeks and see significant improvements. However, as the body adapts, new and different stimuli must be applied to keep making progress. As fitness increases, we near our genetic potential, and the gains we experience become more marginal, or slow down. Suspension Training is a fantastic tool for improving muscular strength during the early stages of a training program. However, at a certain point, straps and body positions must be manipulated to increase the load and to keep getting stronger. Eventually, Suspension Training may not be the primary tool used to continue improving strength; rather, it may be used to maintain strength, improve endurance, or prevent injury in addition to a more traditional weight training program that allows heavier loads to be used.

Reversibility

The reversibility principle is related to the amount, frequency, and consistency of the stress applied to the body. This principle is summed up in the phrase *Use it or lose it.* Stopping training, or significantly reducing the training load, volume, or frequency long enough will result in regression, potentially to pretraining levels. One benefit of Suspension Training is its portability and convenience at times when keeping up normal training schedules is difficult. Maintaining stress on the body during these times can prevent, or at least slow, the detraining process. For example, soldiers on deployment frequently use Suspension Training to maintain fitness when they do not have access to regular training facilities or traditional weight training equipment such as barbells and dumbbells. Additionally, Suspension Training is great for frequent travelers since the equipment takes up minimal space and can be thrown into a bag or suitcase. This helps travelers reduce the number of training days missed while on the road.

VARIABLES OF TRAINING PROGRAM DESIGN

When designing a training program, the frequency, intensity, volume, and speed of training must be considered. Equally important are the rest periods between sets in each session as well as between training days.

Frequency

Frequency of training refers to the number of training sessions performed, usually in the context of a week. The frequency of training is predicated on factors such as the initial training level, the time available, and training goals. For example, two or three training sessions per week would likely suffice if the goal is to improve general fitness. To maintain fitness, one session may suffice, although two (at least) are generally recommended. To reach more robust goals, such as significantly increasing muscle mass, anywhere from three to six days per week may be ideal.

Intensity

Intensity, which refers to the training load (i.e., the amount of weight lifted), may be the factor most critical to the outcome of a training program. In general, loads that permit 12 or more repetitions are suited to improving

muscular endurance. Loads that permit between 8 and 12 repetitions are suited to improving muscle size or general fitness (depending on the volume, or sets × repetitions). Finally, a training load that permits six or fewer repetitions is best for improving strength. This does not mean that training in a range more suited to improving endurance will not enhance strength, or vice versa; it just would not optimize gains in the targeted area. This is a critical consideration for Suspension Training, especially for already well-trained individuals, and will be further addressed in chapter 11.

Volume

Volume of training can be defined as the number of sets multiplied by the number of repetitions (sets × repetitions) performed, or as the load multiplied by the number of sets and repetitions. When using traditional equipment such as barbells and dumbbells, volume is typically calculated using the latter equation. However, those using body weight as resistance (i.e., Suspension Training) generally multiply sets by repetitions because the load moved is often difficult to quantify and varies based on body position. Furthermore, when performing isometric work, such as a plank, sets multiplied by time may be used to quantify volume. For many of the exercises that require one foot in a strap, the overall volume can be equalized by making certain that each limb receives the same amount of stress or time under tension. This can be achieved by performing what is commonly known as a cluster set with the weaker limb. To complete a cluster set, perform as many repetitions as possible, take a brief 10- to 15-second rest, and then complete the set. For instance, suppose you can perform 60 seconds of work on the stronger limb and only 50 seconds of work on the weaker limb. When working on the weaker limb, simply take a break at 50 seconds. Then, perform 10 more seconds of work on the weak limb when you can. The cluster set technique helps you to maintain overall training volume and to use good form throughout the set. This is very important for maintaining body symmetry.

Speed

Speed of movement is an often-overlooked variable in resistance training programs. However, it is critical when seeking to develop specific attributes. For example, power is the optimal combination of force and

velocity to achieve a specific task; every exercise has its own unique power profile. Therefore, the speed of movement during a repetition will either increase or decrease the amount of power produced. Because resistance training exercise is mostly used to improve performance, which is specifically related to power production, speed of movement should be considered in every exercise.

In general, the speed of movement is directly related to and dependent on the load being moved. Maximal loads cannot be moved quickly because creating the appropriate amount of force takes time. Therefore, maximal exercises do not directly improve power. However, this is not to say that maximal lifting does not improve power. Improving overall strength results in being able to move a given load faster because a smaller percentage of maximal strength is required at a submaximal load. For these reasons, using a variety of training loads at different speeds is ideal for improving performance.

Rest

Rest refers to the amount of time between sets and between training sessions. The amount of rest has a significant impact on the quality of the workout and the outcome. To improve muscular endurance, rest periods of 30 to 60 seconds between sets for the same muscles or muscle groups are generally recommended. However, alternating opposing muscle groups (e.g., chest and back) or movements (e.g., push and pull) in the training session creates sufficient rest between muscle groups. This is very beneficial for those with time constraints. To improve muscular fitness or muscle size, rest periods between 30 and 90 seconds are adequate. For strength and power, greater rest periods (three to five minutes) are required to fully replenish energy stores and ensure sufficient effort in subsequent repetitions.

The rest required between training sessions should also be considered. For sufficient recovery, a minimum of 48 hours (and up to 72 hours) should be allowed before muscle groups are trained again. Following a Monday session aimed at training the lower body, the next lower-body training session should be on Wednesday or Thursday to give these muscles time to recover. Table 8.1 provides basic recommendations for each training variable to use when creating plans based on specific training goals.

Training should not be a random process; basic principles of training and conditioning should be followed to maximize results. A periodized program can ensure safe and effective progress and continuing challenge with new stimuli to help work through training plateaus.

Chapters 9 to 13 describe how to use Suspension Training in the context of periodized training and provide sample training programs for improving specific aspects of health, fitness, and performance. In these chapters, a detailed explanation of how to integrate Suspension Training into a comprehensive program using a variety of training tools and modalities is also addressed.

TABLE 8.1 Basic Training Guidelines

	Frequency	Intensity	Volume	Speed	Rest between sets
Muscular endurance	2 or 3 days per week	≤67% of 1RM	1 or 2 exercises per muscle group or movement; 2 or 3 sets for each muscle group or movement; ≥ 12 reps for each exercise	Variable	30-60 sec between muscle groups
Muscular fitness	2-4 days per week	67%-75% of 1RM	1 or 2 exercises per muscle group or movement; 3-6 sets for each muscle group or movement; 10-12 reps for each exercise	Moderate	30-90 sec between muscle groups
Muscle size	3-6 days per week	67%-75% of 1RM	2 or 3 exercises per muscle group or movement; 3-6 sets for each muscle group or movement; 6-12 reps for each exercise	Slow to moderate	30-90 sec between muscle groups

	Frequency	Intensity	Volume	Speed	Rest between sets
Muscular strength	3-6 days per week	Basic strength: 80%-90% of 1RM Max strength: 93% of 1RM Maintenance: 80%-85% of 1RM	1-3 exercises per muscle group or movement Basic strength: 4-8 reps Max strength: 2-6 reps Maintenance: 6-8 reps	Slow	2-5 min between muscle groups
Muscular power	2 or 3 days per week	87%-95% of 1RM for a single rep 75%-90% for multiple reps Variable when using own body weight	1RM for max efforts 6 for multiple reps 6-10 reps for body weight–based power exercises	Fast	2-5 min between muscle groups

Adapted by permission from J. Sheppard and T.N. Triplett, “Program Design for Resistance Training,” in *Essentials of Strength Training and Conditioning,* 4th ed., edited for the National Strength and Conditioning Association by G.G. Haff and T.N. Triplett (Champaign, IL: Human Kinetics, 2016), 458, 463, 465.

CHAPTER 9

Circuit Training

Circuit training programs emphasize the simultaneous development of multiple physical qualities in a single workout, rather than splitting them up into separate sessions. This type of training provides a time efficient method for developing overall fitness, especially for those who have limited time to devote to a training program.

While circuit training favors the development of muscular endurance and toning (slight increases in muscle size and reductions in body fat), the intensity and volume used in these sessions can be manipulated to accommodate a wide variety of training goals. In this chapter, the foundations of developing a circuit training program for improving health, fitness, and overall quality of life will be discussed.

BENEFITS OF CIRCUIT TRAINING

Depending on the type of program, circuit training is best used for developing general physical preparedness (GPP), maintaining health and fitness, preventing injury, and avoiding overtraining. These goals are addressed in the following sections.

Developing General Physical Preparedness (GPP)

When beginning a fitness program, a good base of overall fitness is important to set the stage for higher intensity training and to reduce injury risk. The exercises used at the beginning of a program should be basic and aimed at improving fundamental movement mechanics before moving on to more advanced lifts. Body weight exercises that can be easily progressed or

made simpler with Suspension Training are ideal for developing General Physical Preparedness (GPP).

Advanced fitness enthusiasts and athletes often begin each macrocycle with a GPP phase. This helps transition into activity after an active rest period (e.g., following a sport season or a yearly training cycle). During this phase, the emphasis is on increasing training volume and accumulating more physical stress to improve general fitness and setting the stage for higher-load, lower-volume training focused on strength and power (see chapter 11).

Maintaining Health and Fitness

Because circuit training improves general muscular fitness, it helps not only to develop but also to maintain a general level of health and fitness. Although not maximized, strength and power can be improved using a circuit training program while maintaining a good level of muscular endurance and improving muscle size. This can be especially useful during periods in which access to other forms of training is limited (i.e., travel, facility accessibility, etc.).

Research Note

Physical Demands of Suspension Training Circuits

Dudgeon and colleagues (2015) investigated the physiological and metabolic effects of a 60-minute whole-body Suspension Training circuit broken into two 30-minute segments. For each segment the same 23 exercises were performed in the same order. Each Suspension Training exercise was performed for 30 seconds with a 60-second rest between exercises. The average heart rate (HR) during this workout was 69±2 percent of the subject's age-predicted maximum and the average caloric expenditure was 340.9±13.6 total kcals (i.e., 5.3±0.4 kcal/min). These findings suggest that performing circuit training using a Suspension Training system provides a sufficient training stimulus to improve or maintain physical fitness.

Preventing Injury and Avoiding Overtraining

As mentioned, circuit training programs typically involve exercises that can be performed relatively easily with one's own body weight or light external loading. Suspension Training is excellent for making subtle and progressive resistance changes during the initial stages of learning, and for improving the efficiency of certain movement patterns prior to increasing resistance for that movement (e.g., learning how to perform a body weight squat prior to performing a barbell back squat).

Also, circuit training using Suspension Training is an ideal way to unload the stress on the body from several weeks of increasing intensities during a periodized training program. Reducing this stress allows physiological adaptations to take place.

Finally, specific Suspension Training exercises can be used to reduce muscular imbalances. For instance, upper-crossed syndrome is a condition characterized by a forward head posture and rounding of the shoulders, and associated with a greater risk of injury and musculoskeletal pain. This condition is very common in people who spend a good deal of time in a seated position or who have jobs that are mostly sedentary. This imbalance typically results from tightness in the pectoral and cervical flexors, and weakness in the trapezius, serratus anterior, and rhomboids. In order to address this issue, Suspension Training exercises that emphasize stretching tight muscles and strengthening the weaker ones can help restore balance between these muscle groups.

INCORPORATING SUSPENSION TRAINING INTO A CIRCUIT TRAINING PROGRAM

Suspension Training can be used as a stand-alone training modality or as part of a more traditional circuit training program that uses barbells, dumbbells, and machines to improve muscular fitness. In either case, it is a fun and unique method that can make training feel less monotonous, thereby increasing motivation and enthusiasm for training sessions or workouts.

Using Suspension Training along with an existing program provides variety to muscles. Although the resistance and load for some exercises seem low compared to traditional resistance or weight training, it can be enough to cause muscular fatigue. For this reason, it is important to be

aware of the contribution of Suspension Training to the overall training volume to continue making progress and reduce the risk of overtraining.

Suspension Training is also a great way to warm up the muscles and tendons prior to heavier resistance training. This prepares the muscles surrounding the joints and the core for the increased tension that comes with heavy lifting while also increasing proprioceptor activity at the joints. Performing a Suspension Training exercise as a warm-up to a similar exercise may result in greater force production during the heavier lift.

The use of Suspension Training with an existing training program provides diversity and a greater number of exercises to select and incorporate into a training program. The challenges that Suspension Training provides also help avoid the plateaus encountered in many traditional programs.

CREATING A CIRCUIT TRAINING WORKOUT

To improve fitness and performance for sport and daily activity, TRX advocates specific movement pairings that can be applied to circuit training workouts. These movement pairings are as follows:

1. Push and hinge
2. Pull and squat
3. Lunge and rotate

Further, because many suspension exercises require an isometric contraction of the trunk musculature to perform them correctly, plank-based exercises can be added to any of the movement pairings. In essence, the plank “lives” in all three pairings.

Examples of the three movement pairings can be seen in the exercise selection table in this section. Choosing and performing exercises based on the pairings results in a training approach that focuses on improving functional performance, unlike a bodybuilding approach that is aimed at training specific muscle groups. However, the movement pairing framework can be used to develop training programs that are focused on specific muscle areas (e.g., upper-body push-pull, lower-body push-pull) if this better meets the user’s goals.

Creating Your Own Circuit

INSTRUCTIONS

Movement pairings	Option 1	Option 2	Option 3
1a. Push	TRX chest press (pg. 54)	TRX push-up (pg. 56)	TRX chest press with weighted vest (pg. 54)
1b. Hinge	TRX single-leg Romanian deadlift (pg. 100)	TRX single-leg Romanian deadlift (pg. 100)	TRX single-leg Romanian deadlift with weighted vest (pg. 100)
2a. Pull	TRX high row (pg. 82)	TRX assisted chin-up (pg. 80)	TRX low row (pg. 79)
2b. Squat	TRX overhead squat (pg. 106)	TRX single-leg squat (pg. 111)	TRX squat jump (pg 121)
3a. Lunge	TRX lunge (pg. 108)	TRX crossing lunge (pg. 116)	TRX suspended reverse lunge (pg. 114)
3b. Rotate	TRX standing rotation (pg. 151)	TRX oblique crunch (pg. 149)	TRX power pull (pg. 152)

Note: These exercises may be switched with other exercises from chapters 5 through 7 that use similar movement patterns. Also, plank-based exercises can be added at the user's discretion.

The following chart has been designed to help users create their own total-body circuit training workout. This approach manipulates certain specific training variables to help develop foundational movement skills as well as add variety and challenge to a training session.

STEP 1: EXERCISE SELECTION

Select one exercise for each of the TRX movement pairings.

STEP 2: BASIC STRUCTURE: TIMED CIRCUITS VERSUS FIXED NUMBER OF REPETITIONS

Select one of the following options:

- *Fixed amount of time:* Complete as many repetitions as possible in a specific time frame. In general, the longer the work time is, the greater the rest required before performing the next set. The following are a few examples ranging in intensity from easiest to most difficult.
  - 20 seconds of work; 40 seconds of rest (1:2 work-to-rest ratio)

    - 20 seconds of work; 20 seconds of rest (1:1 work-to-rest ratio)
    - 30 seconds of work; 60 seconds of rest (1:2 work-to-rest ratio)
    - 30 seconds of work; 30 seconds of rest (1:1 work-to-rest ratio)
    - 60 seconds of work; 60 seconds of rest (1:1 work-to-rest ratio)
    - 60 seconds of work; 30 seconds of rest (2:1 work-to-rest ratio)
    - 20, 30, or 60 seconds of work; minimal rest or no rest between sets (This should only be done when alternating exercises; see step 4.)
- *Fixed number of repetitions:* Select a weight that will allow you to perform only a certain number of repetitions prior to moving to the next set. Here are some examples:
    - 8 to 12 repetitions (general muscular fitness)
    - 12 to 20 repetitions (general muscular endurance)
    - 20 to 50 repetitions (general muscular endurance/cardiorespiratory conditioning)

STEP 3: NUMBER OF SETS PERFORMED

Select one of the following options:

- *Fixed number of sets:* Perform a fixed number of sets and repetitions for each exercise (e.g., 2 sets of 20-30 repetitions, 3 sets of 12-15 repetitions, 4 sets of 8-12 repetitions).
- *Fixed amount of time:* Perform as many sets as possible in an allotted time frame. For example, perform as many rounds as possible for 20 to 30 minutes.

STEP 4: EXERCISE ORDER

Select one of the following options:

- Perform all sets of one exercise before moving to the next movement in the pairing.
- Perform a superset by alternating between movements in the movement pairing (e.g., 1 set of push movement and 1 set of hinge movement, repeating until all sets in the pairing are complete) before moving on to the next pairing.
- Perform a single set of each exercise before moving on to the next. Perform all exercises in the circuit, one after the other, until

all sets for the circuit have been completed or for the time allotted.

Research Note

Suspension Training Circuits Improve Body Composition and Strength in Overweight Women

Dolati et al. (2017) conducted an eight-week training study to determine the effectiveness of a Suspension Training circuit on a number of health- and fitness-related parameters, such as body composition, strength, and aerobic fitness among a group of overweight females. The training sessions were conducted three times per week with the duration and exercise intensity progressing weekly. After eight weeks, significant reductions in body fat percentage as well as fat mass ($p=0.001$) were observed. Furthermore, significant improvements in both upper- and lower-body strength ($p=0.001$), as well as aerobic fitness ($p= 0.002$) were also reported. Based on these findings it appears that a circuit training program using only Suspension Training can improve multiple facets of fitness among similar populations.

CHAPTER 10

Prehabilitation

Injuries can create major setbacks in attaining and maintaining your fitness goals. However, as the old adage goes, “an ounce of prevention is worth a pound of cure.” For this reason, most strength and conditioning professionals working with athletes incorporate “prehabilitation” exercises into their training programs. These are specific exercises that help reduce the risk of injuries common within a sport, or address a previous injury the individual may have experienced. These exercises are not just reserved for athletes; they should be incorporated into training programs aimed at improving health and fitness, as well as performance. In this chapter we will discuss several prehabilitation routines aimed at keeping you healthy and ready to train.

BENEFITS OF PREHABILITATION

Prehabilitation exercises are instrumental in helping reduce the risk of certain types of injuries. During our daily life we perform many habitual movement patterns and may possess previous injuries that can lead to musculoskeletal imbalances. These imbalances may result in compensations that increase the wear and tear on the musculoskeletal system. While a bit of an oversimplification, these imbalances are the result of tightness and weakness in certain muscles, mobility restrictions within the joints, poor neuromuscular control, or a combination of these issues. Since Suspension Training can be used to simultaneously develop a variety of physical

attributes, these exercises provide a unique solution to addressing the problems.

Research Note

Suspension Training Can Improve Postural Distortions That Cause Injury and Pain

In a study conducted by Hamidiyeh et al. (2021), significant improvements in the angle of kyphosis and erector spine muscle strength were discovered in a group of middle-aged males after an eight-week Suspension Training intervention (24 sessions, 60 minutes per day, three times per week). These results demonstrate that the use of Suspension Training can improve postural distortions that may lead to increased risk of injury and pain.

SAMPLE SUSPENSION TRAINING PREHABILITATION SESSIONS

This section outlines several prehabilitation sessions for specific joints, muscles, and body regions. These sessions should be used as a part of more comprehensive training programs and not necessarily as a stand-alone program. Although no prehabilitation program can guarantee that an injury will not occur, being proactive may reduce one's risk and allow more time enjoying recreational and sporting activities and less time on the sidelines. Additionally, addressing these issues can also help reduce pain created by compensatory movement patterns both now and in the future.

It should be noted that these sample sessions are not meant to take the place of a trained medical provider. Those with existing or previous injuries should consult with a trained medical professional, such as a physical therapist, occupational therapist, athletic trainer, or physician, to determine if any contraindications or necessary modifications are required. Anyone who experiences pain during any of these exercises should also seek the advice of a medical professional.

Shoulder Prehabilitation

The shoulder is especially vulnerable during activities that involve throwing or overhead lifting. This is due to the structure of the glenohumeral joint. Essentially, the head of the humerus sits on the glenoid fossa of the scapula and is held in place by four small muscles collectively referred to as the rotator cuff. Strengthening these muscles, as well as those that aid in scapular (i.e., shoulder blade) movement are key to avoiding muscle injury in the shoulder.

INSTRUCTIONS

Perform one to two sets of 10 to 12 repetitions, two to three days per week, on nonconsecutive days. The resistance on these exercises should be light and should not create significant fatigue.

EXERCISES

1. TRX scapular retraction (pg. 78)
2. TRX chest press (pg. 54)
3. TRX high row (pg. 82)
4. TRX W deltoid fly (pg. 86)
5. TRX dual-arm internal rotation (pg. 91)
6. TRX I, Y, T deltoid fly (pg. 88)
7. TRX pec stretch (pg. 46)
8. TRX overhead lat stretch (pg. 48)

Knee Prehabilitation

The knee is an area particularly prone to injury due to overuse or high stress activities. These types of movements tend to irritate the tissues around the kneecap that can lead to acute and chronic knee pain. Furthermore, overpronation at the foot or weakness in the glutes can lead to valgus collapse, which is characterized by one or both knees collapsing inward instead of staying aligned with the foot and hips. Consequently, hip strengthening exercises and other exercises that require the ankle, knee, and hip to maintain alignment are beneficial for improving knee stability.

INSTRUCTIONS

Perform one to two sets of 10 to 12 repetitions, two to three days per week, on nonconsecutive days.

EXERCISES

1. TRX hip press (pg. 145)
2. TRX side plank (pg. 148)
3. TRX single-leg knee extension (pg. 127)
4. TRX hamstring curl (pg. 130)
5. TRX deep squat (pg. 97)

Low Back Prehabilitation

Low back prehabilitation is important in most physical activities. The causes of low back pain are many and varied; regardless of the cause, strengthening the muscles around the spine is often effective. Equally important is strengthening the muscles of the trunk such as the abdominals, as well as strengthening and improving movement patterns.

INSTRUCTIONS

Perform one to two sets of 10 to 12 repetitions, two to three days per week, on nonconsecutive days. Note: If any of the following exercises cause pain in the lower back, they should be omitted and a medical professional should be consulted.

EXERCISES

1. TRX forearm plank (pg. 137)
2. TRX figure-four stretch (pg. 102)
3. TRX reaching hip flexor stretch (pg. 103)
4. TRX cobra stretch (pg. 134)
5. TRX crunch (pg. 140)
6. TRX oblique crunch (pg. 149)
7. TRX hip press (pg. 145)
8. TRX Pallof press (pg. 154)

Research Note

Functional Movement Screen Scores Improve With Suspension Training

The Functional Movement Screen (FMS™) is frequently used by coaches, researchers, and sports medicine professionals as a tool to identify injury risk among a wide variety of populations. In a study by Shavikloo and Norasteh (2019) it was discovered that FMS scores significantly improved among a group of futsal players that participated in a six-week (three times per week) Suspension Training program compared to a control group. These results highlight the benefits of using Suspension Training as part of a comprehensive injury reduction strategy among athletic populations.

CHAPTER 11

Strength and Power

Strength and power are two highly desirable attributes for athletes. In the sport world, the value of being able to exert high levels of force quickly is evident; however, this ability is also important for improving and maintaining quality of life throughout the life span. Possessing adequate strength and power improves not only the performance of recreational activities and activities of daily living, but also the ability to respond in emergency situations, all while reducing the risk of certain types of injury.

This chapter discusses how to improve strength and power through a combination of traditional resistance training methods in conjunction with Suspension Training. By incorporating a variety of training modalities into strength and power training programs, exercise adherence may be improved by reducing training monotony. Furthermore, using Suspension Training may aid in the development of lagging muscle groups by incorporating a variety of auxiliary, or complementary, exercises into a training program that may not be addressed adequately during bigger lifts (i.e., squat, deadlift, bench press).

BENEFITS OF STRENGTH AND POWER

Strength and power, two physical attributes essential to high-level performance and activities of daily living, are often lumped together. Although they are strongly linked, they are separate qualities, and they must be trained differently to maximize performance. In the following section,

the differences between strength and power will be further discussed, and specific strategies for developing these attributes will be addressed.

Strength can be defined as the ability to exert a maximal, or near maximal, force. The ability to exert this force is not dependent on time. In fact, the greater the amount of time available to lift a load, the greater the number of muscle fibers that can be recruited to assist in moving that load. For example, in the sport of powerlifting the main goal is to lift as much weight as possible for three specific lifts—the bench press, squat, and deadlift. As the weight increases, the amount of time required to move the weight increases. This is because the amount of force required to lift a heavy weight is very high. As the force needed to move a weight increases, the greater the amount of muscle an individual must recruit. This takes time because movements that require a great deal of strength must be performed slowly in order to allow enough muscle recruitment to lift the load.

In contrast, power is the ability to produce force rapidly and is often expressed mathematically as work over time (i.e., Power = work/time). It is important to understand that every movement we produce requires some degree of power. For example, the vertical jump is performed by generating enough force at a high enough velocity to overcome the pull of gravity (32.2 ft/ sec^2 or 9.81 m/sec^2). When performed slowly, the vertical jump resembles a squat because not enough power is generated to produce thrust, or liftoff. In general, stronger individuals do not have to work as hard to overcome gravity (i.e., inertia) as weaker individuals. For this reason, individuals that have good relative strength, or high levels of strength in relation to their body mass, are typically able to jump higher than individuals that possess greater absolute strength.

People often think strength and power development is reserved for only athletic populations. However, the need for strength and power is essential in daily life to perform activities with greater efficiency. Improving strength and power can reduce the physiological burden placed on an individual when performing these tasks, and consequently the tasks become easier to perform and there is less stress on the body. Furthermore, the ability to exert force rapidly may help reduce injury risk, especially as we age. For these reasons, some form of strength and power training should be performed in most populations. The key is adjusting the training program based on an

individual's physical strengths and limitations. These adjustments will be discussed in greater detail later in this chapter.

Research Note

Suspension Training May Improve Acute Strength and Power

Research by Giancotti et al. (2018) found that performing a 50-minute Suspension Training session resulted in significant ($p < 0.05$) improvements in acute strength and power among male subjects. It should be noted that performance also improved among females though statistical significance was not achieved. Because these results show that Suspension Training may improve acute strength and power performance, the authors suggest that Suspension Training be used as a dynamic warm-up in sports and activities that require strength and power.

DEVELOPING STRENGTH AND POWER

Developing strength and power requires a good base of muscular endurance and fitness to support and accommodate the higher levels of stress placed on the musculoskeletal and neurological systems; therefore, strength and power training are typically performed after an individual has first established a good base of general fitness. Strength and power training also requires a good level of mobility, stability, and motor control to execute movements correctly. These factors help increase the ability to synergize the joints and joint structures in more biomechanically advantageous positions to generate force while reducing injury risk.

Because power is the optimal combination of force and speed to perform a task, strength is generally considered a precursor to power. In other words, lacking the appropriate level of strength to generate force during explosive movements reduces power potential. Therefore, those seeking to improve power must first dedicate an appropriate amount of time to enhancing strength. For example, in plyometric, or jump-based, training, force is required to jump as high as necessary; however, strength is still required to land in a good biomechanical position to absorb the force of the landing, or

to transition to another movement in a sporting activity (e.g., a jump to a sprint).

INCORPORATING SUSPENSION TRAINING INTO A STRENGTH AND POWER TRAINING PROGRAM

Suspension Training exercises can be used as a primary method of developing strength and power or as an ancillary method depending on the individual's strength level and training experience. However, when seeking to develop these attributes, particularly strength, certain limitations with this modality should be acknowledged. Although strength can be developed through a wide range of training loads and repetitions, strength is typically best developed when the individual is able to perform eight or fewer repetitions of a given load. For this reason, using Suspension Training to develop strength may be most useful with beginning exercisers. However, there are several variations that can be used by advanced lifters to increase the overall training demands placed on the body and to challenge strength. These exercises may be used exclusively, or as part of a comprehensive training program using both Suspension Training exercises and traditional forms of training (i.e., barbells, dumbbells, resistance training machines). Thus, regardless of fitness level, Suspension Training can play a valuable role in the development of strength and power for both novice and advanced lifters. The following section will provide several suggestions on how to incorporate Suspension Training into strength and power training programs.

Priming the Muscles for Bigger Lifts

Suspension Training exercises can be used as priming, or neuromuscular activation, exercises to prepare for heavier lifts, such as performing a TRX hip press a few minutes prior to performing a back squat with a barbell. When the individual attempts the heavier lift with the barbell, the stabilizers of the hip and trunk are preactivated, which may improve inter- and intramuscular coordination when performing heavier lifts in a more stable environment. It should be noted that when using this technique, the weight used should be relatively light so that these smaller muscle groups are stimulated and not significantly fatigued prior to a heavy lift.

Improving Lagging Muscles and Muscle Groups

Some people find that smaller and weaker muscles or muscle groups limit their ability to lift heavier weights or break out of a training plateau. Working these smaller muscle groups may improve strength, thereby improving performance on the target exercise. For example, during a chin-up, the biceps are a secondary mover, whereas the latissimus dorsi is the prime mover. Strengthening the biceps may result in the ability to perform more chin-ups.

Improving Training Density

Improving training density means doing more training in less time. This can be done by adding Suspension Training exercises aimed at improving mobility, stability, and coordination between heavy lifts in a strength and power program. While this does not directly improve strength and power, working on these attributes between heavier lifts can complement strength and power performance.

Preventing Injury and Overtraining

Suspension Training exercises may challenge the stabilizer muscles to a larger extent than traditional resistance training exercises. This can improve joint stability and motor control, which enhances coordination and movement economy. Additionally, many of the drop drills can be used to improve dynamic stability, increase joint position sense, and teach proper landing mechanics as a precursor to plyometric training. The ability to decrease the load while increasing the intensity makes Suspension Training a valuable asset to any training program.

Maintaining Strength and Muscular Fitness

While Suspension Training may not provide a sufficient stimulus to increase strength in all circumstances, it can provide enough of a stimulus to help minimize loss of muscular fitness when access to training is hindered. This may be especially useful when traveling. Since Suspension Training systems take up minimal space, they can be easily packed and transported. This makes Suspension Training a great option when on the go.

Developing Strength Using Suspension Training

A sufficient load, or training weight, must be used to optimize strength gains. For some people, especially beginners, body weight exercises provide the challenge necessary for improving strength. This does not mean that working in higher repetition ranges will not improve strength, only that it will not optimize strength. To significantly increase strength, a person may need to manipulate certain Suspension Training exercises or add weight to these exercises to elicit a training adaptation. For example, a low row may not provide enough stimulus for a well-trained individual to gain strength, so manipulating the angle of resistance (i.e., performing an inverted row instead) may provide a simple solution for increasing the intensity of this movement. If this still does not provide enough resistance, performing a single-arm variation of this same exercise, adding a weighted vest, or a combination of these techniques may be required to increase the training stimulus.

Time under tension (TUT) training is another training option for stronger individuals. This technique requires slow movements to increase the amount of time the muscle is under stress, and is accomplished by increasing the amount of time spent lowering and lifting of the resistance being used. This technique progressively overloads the muscle using volume rather than increased training load. For example, if it normally takes five seconds to perform five push-ups, using TUT it may take up to 30 seconds (two seconds in the lowering phase, two seconds holding the body in the down position, and two seconds to return to the starting position). This technique is more challenging than traditional push-ups performed as quickly as possible, because it reduces the amount of stored elastic energy that can be developed and used from the rapid stretch of the shoulder and pectoral muscles.

TUT may be beneficial for increasing strength in the ligaments and connective tissues, as well as smaller stabilizer muscles. These improvements may lead to greater overall gains in strength and power. The following are a few examples of how to use the TUT method. These can be applied to any of the dynamic Suspension Training (nonisometric exercises) in this text:

- *2-second descent*: 1-second hold, 2-second ascent (2-1-2 count)
- *3-second descent*: 1-second hold, 3-second ascent (3-1-3 count)

- *5-second descent*: 1-second hold, 5-second ascent (5-1-5 count)
- *2-second descent:* 2-second hold, 2-second ascent (2-2-2 count)
- *3-second descent:* 3-second hold, 3-second ascent (3-3-3 count)
- *5-second descent:* 5-second hold, 5-second ascent (5-5-5 count)
- *2-second descent:* 5-second hold, 2-second ascent (2-5-2 count)

These are a few suggestions on how to manipulate the tempos when using the TUT method. Remember, as the time that your muscles are under stress increases, muscular fatigue will also increase. Typically, the larger the muscles being worked the greater the amount of time the muscles can be under tension, and vice versa. If you are unable to perform the exercises with good form and technique for all of the desired repetitions, simply reduce the intensity of the exercise by changing your body position.

Using the TUT method with Suspension Training can increase the intensity of an exercise while maintaining the safety of using a lighter load. These methods are also good for improving motor learning, joint position sense, and body awareness, which translates to a greater ability to stabilize and support heavier training loads.

Developing Power Using Suspension Training

Plyometric exercises are commonly used to improve power. The term *plyometric* literally means to increase distance or measure. These exercises rely heavily on the stretch–shortening cycle, proprioceptors, and stored elastic energy to produce power. The following are the three phases of a plyometric movement:

1. Rapid and eccentric loading or descending portion of the movement
2. Concentric action (force production or the propulsive phase of the movement)
3. Amortization phase (the time between the eccentric loading and concentric force production portion of these movements).

To fully benefit from this form of training, the time spent in the amortization phase should be as little as possible in order to take full advantage of the stored elastic energy developed during the eccentric phase of the movement. However, maintaining good form when first learning these drills, or as fatigue builds, can be difficult. Two major reasons for this are poor technique and a lack of strength to maintain proper body position

when absorbing landing forces. For this reason, it is recommended that prior to adding power training to an exercise program, an adequate base of strength is developed. It is also recommended that drop landing drills that teach an individual how to properly absorb force be the focus prior to performing jumps. This will help reinforce good landing mechanics and help reduce the risk of injury as the power training program progresses.

SAMPLE SUSPENSION TRAINING STRENGTH AND POWER PROGRAMS

The following are several sample strength and power programs using Suspension Training**.** Those who can perform more than eight repetitions for four consecutive sets of an exercise can progress to the next level. Someone who can perform more than eight repetitions of the exercises can increase the intensity by adding resistance in the form of a weighted vest.

Following the strength programs are three sample power programs using plyometrics. These programs should be performed prior to lifting sessions. Performing these exercises under fatigue decreases the ability to maintain good form and technique, which reduces both safety and effectiveness. Each drill should be performed with the best technique possible to ensure proper movement mechanics. The program choice should be based on the level of experience with the exercises; however, it is good to start with the beginner program and advance only after developing a good base of fitness and mastering technique for each exercise.

Sample Total-Body Strength Training Workout

INSTRUCTIONS

Perform this workout two to three days per week, on nonconsecutive days. For each exercise, perform three to four sets of six to eight repetitions. If able to lift for more than six to eight repetitions, increase the training intensity by adding additional weight (i.e., weighted vest), modify to a single-limb variation, or increase the TUT. The exercises in this workout have been structured using supersets (i.e., perform one set of an exercise, then perform the next, and repeat until all sets are complete). This minimizes the rest needed between sets. Allow at least 60 to 90 seconds of rest between sets. Between the sets, mobility, balance, and flexibility exercises can also be added to improve the density of training.

EXERCISES

Superset	TRX lunge* (pg. 108)
	TRX low row* (pg. 79)
Superset	TRX push-up* (pg. 56)
	TRX assisted pike (pg. 136)
Superset	TRX high row* (pg. 82)
	TRX biceps curl*, ** (pg. 84)
Superset	TRX single-leg knee extension** (pg. 127)
	TRX hamstring curl ** (pg. 130)
Superset	TRX triceps press* (pg. 77)
	TRX calf raise*, ** (pg. 128)

*= A weighted vest can be added to these exercises to increase the exercise intensity

**= Single-limb variations can be substituted to increase the exercise intensity

Sample Upper-Body Strength Training Workout

INSTRUCTIONS

Perform this workout two days per week, on nonconsecutive days. For each exercise, perform three to five sets of six to eight repetitions. If able to lift for more than six to eight repetitions, increase the training intensity by adding additional weight (i.e., weighted vest), modify to a single-limb variation, or increase the TUT. The exercises in this workout have been structured using supersets (i.e., perform one set of an exercise, then perform the next, and repeat until all sets are complete). This minimizes the rest needed between sets. Allow at least 60 to 90 seconds of rest between sets. Between the sets, mobility, balance, and flexibility exercises can also be added to improve the density of training.

EXERCISES

Superset	TRX push-up* (pg. 56)
	TRX low row* (pg. 79)
Superset	TRX inverted shoulder press (pg. 68)
	TRX assisted chin-up* (pg. 80)
Superset	TRX chest fly* (pg. 65)
	TRX high row* (pg. 82)
Superset	TRX kneeling overhead triceps press* (pg. 75)
	TRX biceps curl*, ** (pg. 84)

*= A weighted vest can be added to these exercises to increase the exercise intensity

**= Single-limb variations can be substituted to increase the exercise intensity

Sample Lower-Body and Core Strength Training Workout

INSTRUCTIONS

Perform this workout two days per week, on nonconsecutive days. For each exercise, perform three to five sets of six to eight repetitions. If able to lift for more than six to eight repetitions, increase the training intensity by adding additional weight (i.e., weighted vest), modify to a single limb variation, or increase the TUT. The exercises in this workout have been structured using supersets (i.e., perform one set of an exercise, then perform the next, and repeat until all sets are complete). This minimizes the rest needed between sets. Allow at least 60 to 90 seconds of rest between sets. Between the sets, mobility, balance, and flexibility exercises can also be added to improve the density of training.

EXERCISES

Superset	TRX single-leg squat* (pg. 111)
	TRX kneeling rollout* (pg. 142)
Superset	TRX crossing lunge* (pg. 116)
	TRX mountain climbers (pg. 141) (TUT)
Superset	TRX suspended reverse lunge* (pg. 114)
	TRX single-leg Romanian deadlift* (pg. 100)
Superset	TRX hamstring curl** (pg. 130) (TUT)
	TRX hip press** (pg. 145) (TUT)

*= A weighted vest can be added to these exercises to increase the exercise intensity

**= Single-limb variations can be substituted to increase the exercise intensity

Sample Power Training Workout (Beginner)

INSTRUCTIONS

This workout is designed for individuals new to power training. It emphasizes developing good technique and landing mechanics. These exercises don’t train for power as much as they set the

foundation for more intense power training sessions. More advanced individuals can use this as a warm-up to power training. Perform one to three sets of five repetitions per exercise. For split stance exercises, perform five repetitions per leg.

EXERCISES

1. TRX bodyweight squat (pg. 104) (Hold squat position for a 3 count)
2. TRX lateral squat (pg. 112) (Hold squat position for a 3 count)
3. TRX drop squat (pg. 118) (Hold squat position for a 2 count)
4. TRX drop split squat (pg. 118) (Hold squat position for a 2 count)
5. TRX drop push-up (pg. 69) (Hold squat position for a 2 count)

Sample Power Training Workout (Intermediate)

INSTRUCTIONS

Perform two to three sets of five to six repetitions per exercise. All single-leg exercises should be completed with five to six repetitions on each leg.

EXERCISES

1. TRX countermovement jump to stick (pg. 122)
2. TRX split squat jump to stick (pg. 123)
3. TRX lateral skater with stick (pg. 126)
4. TRX explosive push-up (pg. 70)

Sample Power Training Workout (Advanced)

INSTRUCTIONS

Perform three to four sets of five to six repetitions per exercise. All single-leg exercises should be completed with five to six repetitions on each leg. Each repetition in this series should be performed with minimal rest between repetitions.

EXERCISES

1. TRX countermovement jump to stick (pg. 122)
2. TRX split squat jump to stick (pg. 123)
3. TRX lateral skater with stick (pg. 126)
4. TRX plyo push-up (pg. 72)

Research Note

Children Can Develop Power Using Suspension Training

Marta et al. (2019) compared the effects on power of an eight-week traditional resistance training program versus a Suspension Training program, performed twice a week among prepubescent boys. It was discovered that both programs were effective at improving explosive strength in prepubescent boys. These findings suggest that Suspension Training is an acceptable alternative to traditional resistance training in school-based programs.

CHAPTER 12

Speed and Agility

Speed is one of the most highly desirable attributes in sport. The need for speed is obvious in sprint events, such as in track and field. However, in field and court sports, speed is essential for creating space in relation to defenders when playing offensive positions, and is necessary for reducing space in relation to offensive players when playing defensive positions.

Suspension Training can improve speed and agility by developing the underlying physical qualities that support these characteristics. Improving posture, mobility, and stability via Suspension Training can apply directly to on-field performance, while also building injury resistance. This chapter addresses the speed attributes necessary for succeeding in sport, as well as how to use Suspension Training to develop specific muscles and abilities that can improve speed.

THE DIFFERENCE BETWEEN SPEED AND AGILITY

Although speed and agility have elements in common, they are different qualities. Consequently, improving each of these attributes requires an understanding of their differences. Speed can be defined as the ability to cover a given distance in a certain amount of time. Generally, we think of speed as the ability to move between two points as fast as possible, especially in relation to sports like track and field. However, in most field- and court-based sports, these two points are rarely in a straight line for more than 5 to 10 yards or meters. For this reason, speed can be broken down into straight-line (linear) speed and change-of-direction speed (CODS). CODS

is the ability to change direction with skill and efficiency without a visual, kinesthetic, or auditory stimulus signaling the need to do so. CODS is a critical aspect of agility as it represents a major physical attribute related to this skill. Agility combines CODS (a physical quality) and the ability to react and respond to a stimulus (a cognitive ability).

PHYSICAL QUALITIES THAT CONTRIBUTE TO SPEED AND AGILITY

From a physical standpoint, linear speed and agility depend on the ability to stabilize the trunk and specific joints to create, reduce, and transfer force during running and cutting movements. Mobility at other joints is also essential to promote proper reloading of the musculoskeletal system and to prepare the body to produce force at foot strike. Although the specifics of speed and agility technique are beyond the scope of this book, we present exercises for developing and preparing the musculature and joints to enhance speed technique.

Chu and Korchemny (1993) described two main phases associated with sprinting: the support phase and the flight phase. The support phase starts at foot strike and is where braking occurs. During this phase, the ankle, knee, and hip bend slightly to absorb the force of landing on one leg while the opposite leg's ankle, knee, and hip are flexed in preparation for the next foot strike. The flight phase is characterized by the rising and falling of the center of mass and the time during the sprint cycle in which the feet are not in contact with the ground. Figure 12.1 displays these phases.

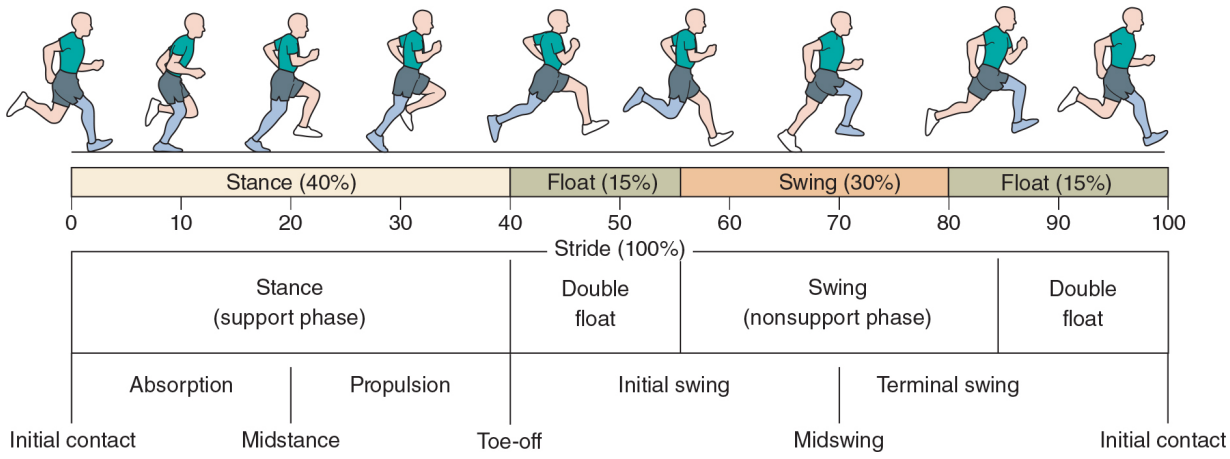


FIGURE 12.1 Phases of the foot strike.

SUSPENSION TRAINING TO IMPROVE SPEED AND AGILITY PERFORMANCE

The biomechanics of running are complex: Many muscle groups need to work in concert for efficient action. Suspension Training can be used to improve three major areas of speed and agility technique: core, upper-body mechanics, and lower-body mechanics. This section presents the relative contributions of specific muscle groups and programs for improving these areas.

Research Note

Six Weeks of Suspension Training Improves Agility Performance

In a 2018 study by Nalbant and Kinik, it was discovered that performing a Suspension Training program twice a week for six weeks resulted in significant improvements in agility performance among 20 elite male basketball players. These findings suggest that agility performance can be improved in a relatively short period of time when using a well-designed Suspension Training program.

Core Training for Speed and Agility

Proper posture is essential for proper sprinting mechanics and change-of-direction speed. Both the back extensors and the abdominal muscles, also known as the core, stabilize the pelvis while running. Therefore, a strong and stable core provides a solid platform, or base, for movement at the shoulder and hip joints. This is essential for maximizing stride length and stride frequency during maximal sprinting and when accelerating. It is also essential for maintaining trunk integrity during agility movements, especially when an unexpected force is presented, such as getting hit by or colliding with an object or opponent.

The gluteus maximus, gluteus medius, and gluteus minimus are critical for controlling motion at the hip joint and for powerful hip extension during the propulsion phase of sprinting. They are also critical for preventing hip drop, which may lead to overuse injuries such as iliotibial (IT) band syndrome, knee pain or injury, and low back issues.

The hip flexors are essential for generating power and forward propulsion during running. The iliopsoas, rectus femoris, tensor fasciae latae, pectineus, and gracilis muscles all contribute to hip flexion. Strong hip flexors are critical for loading the hip to generate force at foot strike. Hip mobility increases the amplitude of the hips' range of motion, which may assist in generating more force.

The following workout is specifically designed to emphasize the areas of the core musculature that can aid in speed development. These exercises can be performed as part of a dynamic warm-up or integrated into a traditional resistance training program.

INSTRUCTIONS

Perform two to three rounds of the following exercises in sequential order. This workout can be performed daily as a preactivation session prior to performing.

EXERCISES

1. TRX hip press (pg. 145): 30 seconds

2. TRX side plank (pg. 148): 30 seconds/side
3. TRX forearm plank (pg. 137): 30 seconds

Upper-Body Mechanics

Arm speed governs leg speed: the faster the arms move and coordinate with lower-body actions, the greater the opportunity to develop speed. Strength in the shoulders and arms is important for efficient arm mechanics. The arms also help decelerate the body and maintain balance during all-out speed episodes and cutting movements. Therefore, strengthening the elbow extensors and flexors, in addition to increasing muscular endurance and joint stability, may result in greater force generation during a hard cut or when decelerating. Additionally, the muscles of the shoulders and back are essential for generating power and explosiveness for lower-body propulsion and leg turnover. The integrity of both the shoulder and elbow joint is also important for remaining relaxed while running so that the postural muscles can stabilize the trunk and shoulders and thus maintain proper body positioning. The musculature also helps maintain speed endurance during longer endurance events, as well as during repeated sprints, by reducing fatigue during the latter stages of a competition.

The following workout emphasizes upper-body exercises that can help with arm mechanics when performing speed and agility drills. These exercises can be performed as part of a dynamic warm-up or integrated into a traditional resistance training program.

INSTRUCTIONS

Perform two to three rounds of the following exercises in sequential order. This workout can be performed daily as a preactivation session prior to performing.

EXERCISES

1. TRX I, Y, T deltoid fly (pg. 88): 12 reps (4 /exercise).
2. TRX chest press (pg. 54): 12 reps
3. TRX inverted shoulder press (pg. 68): 12 reps

Lower-Body Mechanics

Speed is improved by increasing either stride length or stride frequency. Many drills develop these variables by improving balance, mobility, flexibility, power, and strength as addressed in chapters 10 and 12. This section uses a part-to-whole approach to look at muscles that may benefit from isolation work to improve stability and endurance while also enhancing power output for the larger-muscle-group exercises presented in chapter 10.

The exercises that provide the greatest benefit to lower-body speed and agility mechanics focus on triple flexion and extension of the ankles, knees, and hips (e.g., jumps, squats, lunges). These types of exercises have the greatest biomechanical specificity in terms of joint action and force production to speed and agility actions. There are also several muscle groups that may also benefit from additional isolation exercises, especially the hamstrings, quads, and calves. Training these specific areas may also be useful for reducing certain types of injuries. In this section, the use of these muscles in springing and agility movements will be further discussed.

MUSCLES OF THE THIGH

The function of the hamstrings is to decelerate the leg during knee extension and to assist in knee flexion during running to position the leg for the next foot strike. Training the hamstrings is critical to reduce the risk of overuse injury and to prevent overstretching at the knee joint. Therefore, the hamstrings must be both strong and pliable to control high-speed stretching (eccentric muscle actions), yet strong enough to prevent knee hyperextension at ground contact.

The quadriceps, or the muscles that make up the front of the thigh, consisting of the rectus femoris, vastus medialis, vastus lateralis, and vastus intermedius, serve several functions when running. Knee extension during running occurs when the leg straightens to prepare to make ground contact. When the foot makes ground contact the quadriceps also act as shock absorbers.

CALVES

The gastrocnemius and soleus muscles make up the calves. The gastrocnemius crosses both the knee and the ankle joint, whereas the soleus crosses only the ankle. The rapid eccentric loading of the gastrocnemius and soleus, combined with plantar flexion of the ankle, is responsible for the powerful push-off action that occurs at foot strike. Both are vital for locomotive movements such as walking and running.

The following workout emphasizes lower-body exercises that can help with leg mechanics when performing speed and agility drills. These exercises can be performed as part of a dynamic warm-up or integrated into a traditional resistance training program.

INSTRUCTIONS

Perform one to three rounds of the following exercises in sequential order. This workout can be performed daily as a preactivation session prior to performing.

EXERCISES

1. TRX front squat (pg. 107): 10 reps
2. TRX calf raise (pg. 128): 10 reps/leg
3. TRX drop squat (pg. 118): 5 reps
4. TRX countermovement jump to stick (pg. 122): 5 reps
5. TRX hamstring curl (pg. 130): 5 reps, 3-1-3 TUT
6. TRX single-leg knee extension (pg. 127): 5 reps, 3-1-3 TUT

Research Note

Hamstring and Glute Muscle Activation Greater During Suspended Lunge Versus Standard Lunge

The hamstrings and glutes play a major role in speed and agility performance. Research by Krause et al. (2018) demonstrated that recruitment of these muscles was significantly ($p < .001$) greater when performing a suspended lunge compared to a standard lunge. Based on these findings, the authors concluded the suspended lunge is a more demanding exercise for hip muscles compared to a standard lunge.

CHAPTER 13

Balance, Stability, and Flexibility

Movement is a complex process that requires harmonious interactions of the neuromuscular and musculoskeletal systems to produce, reduce, and resist forces. Unfortunately, muscle imbalances, improper technique, previous injury, and repetitive physical stress can keep these systems from functioning properly. For these reasons, addressing faulty movement patterns is imperative for health, fitness, and performance.

Balance, stability, and flexibility are critical to athletic performance, good health, injury prevention, and most daily activities. Moreover, the natural aging process tends to result in a reduction in both balance and flexibility, which may impede function and the ability to live independently. For these reasons, it is extremely important to attain acceptable levels of these qualities and to maintain them throughout the life span. This chapter addresses factors that influence balance, stability, and flexibility, and explains how to develop them using Suspension Training.

BENEFITS OF BALANCE, STABILITY, AND FLEXIBILITY

This section discusses the major benefits and differences between balance, stability, and flexibility. It also explains how they interact to foster efficient movement and neuromuscular activity.

Balance

Balance can be defined as the ability to maintain equilibrium. In terms of movement, balance is generally thought of as trying to control one's center of mass within the base of support. As weight shifts, numerous subtle adjustments are needed to remain in a balanced state and to keep from falling. Although this seems to be a relatively simple concept, the ability to maintain balance, especially during activity, is a very complex process. The central nervous system must process information received from the balance mechanisms in the inner ear, the eyes, and the receptors in the joints and muscles (proprioceptors). It then sends this information back to the musculoskeletal system to create both static (in place) and dynamic (with movement) equilibrium.

Improving balance requires performing activities that challenge balance. Including Suspension Training exercises in a comprehensive training program is an excellent way to add progressive amounts of instability in a safe, controlled environment while also enhancing proprioception.

Stability

Stability, or motor control, is the ability to resist unwanted movements. Stabilizing joints and joint structures during movement is necessary for producing and reducing force, as well as for resisting unwanted forces on the body during sudden or unanticipated movements. For instance, during sprinting or jumping, it is important to stabilize the trunk to transfer the forces created from the ground up through the body to move either horizontally or vertically. An inability to stabilize the torso creates energy leaks within the body that result in unwanted and inefficient movements that may interfere with performance and increase the risk of injury.

One of the major benefits of using Suspension Training within a training program is that most Suspension Training exercises require and develop

trunk stability. For example, a biceps curl or triceps extension exercise performed on a Suspension Trainer becomes a dynamic trunk stability workout as well as a way to work on aesthetic goals such as improving the tone or size of the upper arms. This is especially useful for those who want to develop the biceps and triceps, which is a goal often considered irrelevant to sport functioning. Incorporating these exercises into a workout can increase enthusiasm for training by meeting both aesthetic goals and training objectives.

Flexibility

Flexibility is the ability to move freely throughout a wide range of purposeful movements without restriction. Some refer to it as the available range of motion around a joint. Technically, this describes mobility, because it relates to joint function rather than tissue (muscle) extensibility. Flexibility can be thought of as the muscles' range of motion, whereas mobility can be thought of as the joints' range of motion. However, the two are intimately related. Poor flexibility in the muscles that surround a joint can certainly impede joint range of motion, or mobility. Flexibility is affected by variables such as age, gender, joint structure, activity level, and heredity. Of these, the only modifiable factor is activity level. Performing exercises through joints' full safe ranges of motion can improve both flexibility and mobility.

Similar to balance, flexibility can be classified as both static and dynamic. Static flexibility exercises are best for improving long-term flexibility, whereas dynamic flexibility exercises improve short-term flexibility. Therefore, using dynamic flexibility exercises prior to a workout session is a great way to prepare the body for more vigorous activity. In contrast, static flexibility exercise is best used postworkout to reduce muscle imbalances and improve body symmetry.

Research Note

Research Demonstrates Suspension Training Is a Viable Method for Improving Balance, Core Stability, and Flexibility

In a study by Janot et al. (2013), it was discovered that after completing a seven-week Suspension Training program, significant improvements in core muscular endurance, balance, and flexibility were discovered in a group of recreationally active males and females. These results suggest that Suspension Training is an effective tool for developing these physical attributes.

SAMPLE BALANCE, STABILITY, AND FLEXIBILITY PROGRAMS

The following programs improve balance, stability, and flexibility. Depending on current fitness levels, they may be used as stand-alone workouts, as active recovery programs between more intense training sessions, or as part of a dynamic warm-up prior to traditional resistance training.

Sample Balance Training Workout

Holding the straps of the Suspension Trainer is an excellent beginning balance training exercise because it provides additional, yet slightly unstable, support. Performing floor exercises unilaterally or on an unstable surface (e.g., foam pad) can further challenge the proprioceptors. Although most exercises for balance involve the lower body, some upper-body floor exercises, such as planks, can also be used.

In general, the progression of Suspension Training balance exercises should be from a two-point base to a one-point base.

The following exercise session can be used to develop both static and dynamic balance. These exercises are best performed as part of an integrated dynamic warm-up or as an active recovery day.

INSTRUCTIONS

Perform one to three rounds of the following circuit two to three times per week on nonconsecutive days.

EXERCISES

1. TRX Y balance (pg. 96): 5 reps in each direction

2. TRX overhead squat (pg. 106): 5 reps
3. TRX lateral squat (pg. 112): 5 reps on each side
4. TRX lunge (pg. 108): 5 reps on each side
5. TRX single-leg Romanian deadlift (pg. 100): 5 reps on each side
6. TRX figure-four stretch (pg. 102): 5 reps on each side

Sample Core Stability Workout

Core strength stability is essential for optimal performance. The core provides a stable base of support that facilitates fluid and precise arm and leg movements. The following program emphasizes core stability and control. It can be used as a dynamic warm-up prior to a traditional resistance training session or as a stand-alone workout.

INSTRUCTIONS

Perform the exercises in order for one to three rounds with no more than one minute of rest between rounds. Perform this circuit two to three times per week on nonconsecutive days.

EXERCISES

1. TRX hip press (pg. 145): 10 reps; hold at the top for 2 counts, then slowly lower the hips until they are approximately two to three inches (5 to 8 cm) off the ground, then return to starting position
2. TRX side plank (pg. 148): 10 reps on each
3. TRX pike (pg. 144): 10 reps
4. TRX mountain climbers (pg. 141): 20 reps
5. TRX walking plank (pg. 138): 20 reps

Sample Flexibility Training Workouts

Suspension Training can be used to improve both static and dynamic flexibility. Performing purposeful dynamic movements at a low intensity improves the dynamic flexibility of muscles, tendons, and surrounding connective tissue. Using Suspension Training

statically provides the advantage of gravity or resistance to increase range of motion. The following dynamic and static flexibility workouts can be used as part of a Suspension Training session before (dynamic) and after (static) a traditional strength training session to improve flexibility.

The exercises in these workouts progress in difficulty based on the angle of the body in relation to the anchor point. As in resistance training, an increased angle increases the difficulty of the stretch. Some exercises appear as both dynamic and static flexibility exercises; the main difference between these types of exercises is the amount of time spent holding the stretch (no more than a few seconds in dynamic versions, and longer in static versions).

Dynamic Flexibility Workout

This workout should be performed as part of a warm-up prior to an exercise session. These exercises prepare the musculoskeletal system for more vigorous activity.

INSTRUCTIONS

Perform one to two rounds for each exercise. Briefly hold the stretched position for a 1 to 22 second count before performing the next repetition. This session can be performed all or most days of the week.

EXERCISES

1. TRX overhead squat (pg. 106): 10 reps
2. TRX lateral squat (pg. 112): 5 reps on each side
3. TRX reaching hip flexor stretch (pg. 103): 5 reps on each side
4. TRX crossing lunge (pg. 116): 5 reps on each side
5. TRX chest fly (pg. 65): 10 reps

Static Flexibility Workout

This program should be performed at the end of a training session to improve flexibility. This session can be performed all or most days of the week.

INSTRUCTIONS

Choose at least one exercise for each body region. Hold the stretched position for 10 to 30 seconds. Perform one to three sets for each exercise for a total duration of 30 to 60 seconds. The following is a sample static stretching program. These exercises can be replaced with more advanced exercises as the user progresses. This session can be performed all or most days of the week.

EXERCISES

1. TRX pec stretch (pg. 46)
2. TRX overhead lat stretch (pg. 48)
3. TRX rear deltoid stretch (pg. 49)
4. TRX deep squat (pg. 97)
5. TRX lateral squat (pg. 112)
6. TRX pigeon stretch (pg. 101)

Balance, Stability, and Flexibility Workout

The following is a dynamic warm-up routine that combines balance, stability, and flexibility.

INSTRUCTIONS

Perform one to three rounds of the following exercises two to three days per week on nonconsecutive days.

EXERCISES

1. TRX hip press (pg. 145): 20 reps
2. TRX walking plank (pg. 138): 20 seconds
3. TRX side plank (pg. 148): 20 seconds on each side
4. TRX crunch (pg. 140): 10 reps
5. TRX push-up (pg. 56): 10 reps
6. TRX overhead squat (pg. 106): 10 reps
7. TRX lateral squat (pg. 112): 5 reps on each side
8. TRX crossing lunge (pg. 116): 10 reps on each side
9. TRX Y balance (pg. 96): 5 reps each direction

Research Note

Suspension Training Programs May Reduce Fall Risk in Older Adults

A research study by Kalantariyan et al. (2020) reported that among healthy older adults, a high-intensity interval training program using Suspension Training significantly decreased participants' fear of falling, and improved gait and dynamic balance compared to a control group. Based on these findings, it appears that a high-intensity interval training program using a Suspension Training system may significantly reduce fall risk among older adults.

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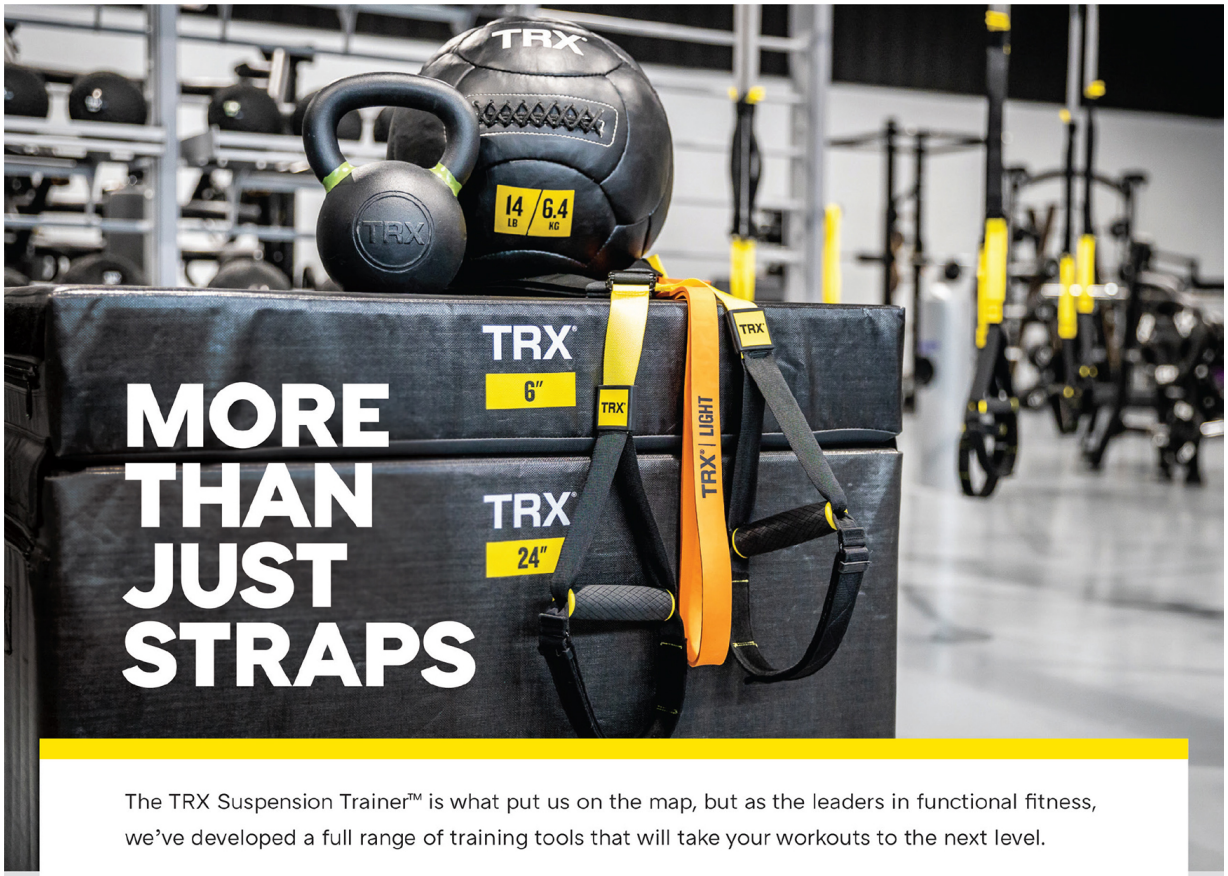

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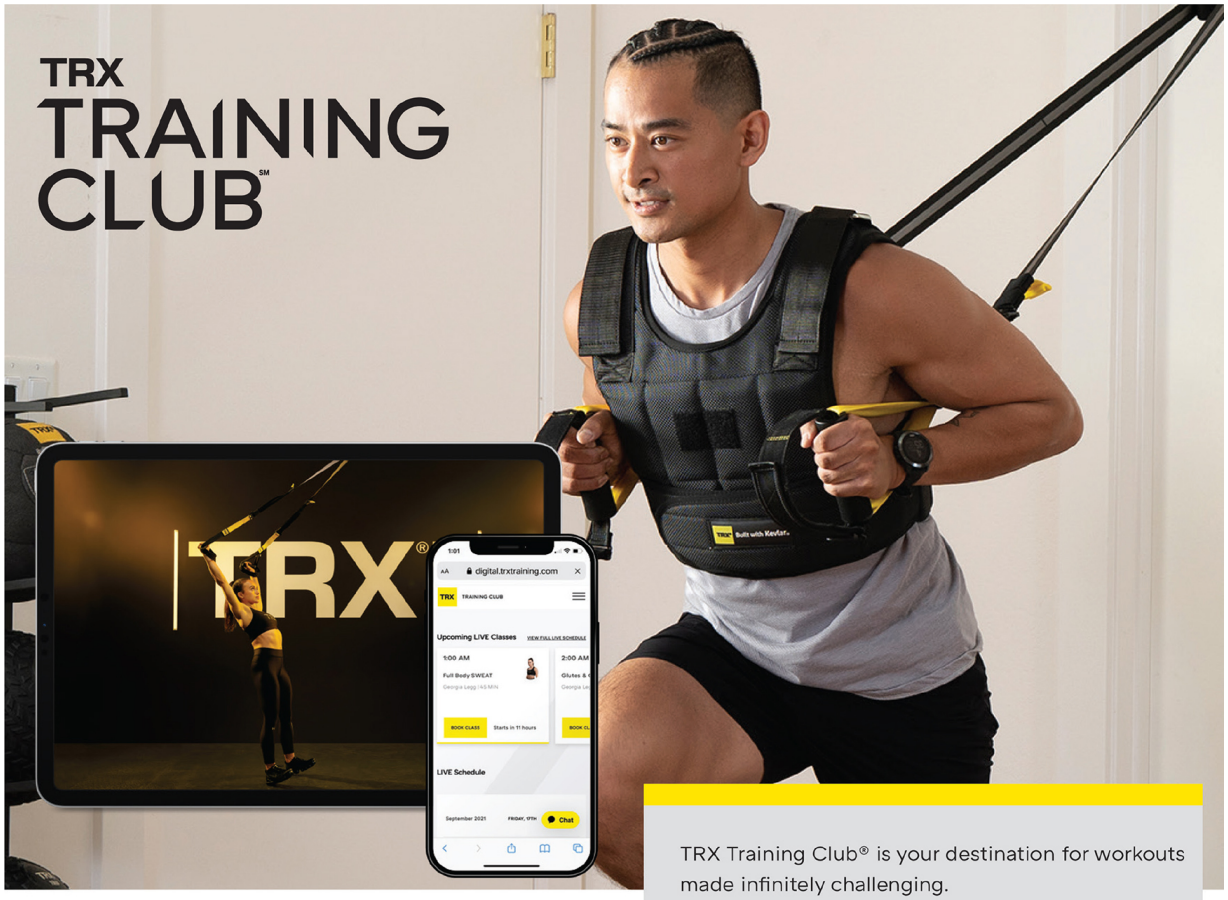

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