



Prevail Prosthetics & Orthotics

Transfemoral (Above Knee) Exercise Manual

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How to Use this Manual

Use one new manual for each new patient you treat. It will become their personal exercise manual they can use as part of a home exercise program. When the patient discharges from your care, be sure to educate them on the importance of continuing this exercise program.

This guide is meant to be a starting point for new amputees. While the exercises contained in this manual are a comprehensive guide to treating a patient with the loss of a limb, they are not meant to be a guide to treating the patient as a whole. These exercises concentrate only on building the core muscles required to ambulate with a prosthesis. A skilled therapist will supplement these limb loss exercises with other case appropriate exercises/treatment to provide each patient with the individualized care they require. This means the therapist should identify any other co-morbidities that could hinder the rehabilitation progress. Examples include identifying and treating any back pain, sound limb deficits such as hip, knee or ankle pain, sound limb contractures, and more.

Contracture Management

Make sure your treatment includes oversight and management of any joint contractures; both the prevention and correction. Be sure you distinguish the difference between muscle tightness and muscle shortness. Tight muscles will show improved flexibility on the first therapy session and will only require a small amount of time before they exhibit normal range of motion (ROM). On the other hand, shortened muscles will require a minimum of four weeks of stretching before there is a noticeable improvement in ROM, if any improvement in muscle length occurs at all.

Please Note: Prosthetists should not accommodate for a contracture within a prosthesis unless ample time has been given to remedy a tight or shortened muscle.

Treatment Overview

1. Functional mobility

- Transfers
- Bed Mobility
- Positioning/Stretching

2. Strengthening/conditioning

- Prepares the patient for prosthetic ambulation

3. Residual limb management

- Reduce limb swelling using a shrinker
- Desensitization (see below)
- Scar mobilization (see below)

Within 1-2 weeks of post-op

Conduct desensitization exercises using:

- Ice cubes
- Pin
- Towel
- Deep pressure
- Heat
- Brush

When incision is healed and “has only very small scabs”

Begin to mobilize tissue around incision using:

- Cocoa Butter (or Similar)

This will also supplement a stump shrinker by bolstering venous return. Plus it will loosen subcutaneous tissues so tissues move more freely. Pay particular attention to any tissue adherence to the distal tibia or distal femur. Pressures inside of a prosthesis will displace tissues on the limb and any tissues that is “hypo-mobile” can be symptomatic and can prevent the patient from making progress in their rehabilitation.

Goals of the Pre-Prosthetic Program

1. Trans-Femoral patients should work towards achieving 0-10 degrees of hip extension.
2. Patient should complete a minimum of six weeks of strength/ROM training on the primary prosthetic gait muscles outlined in this manual.

The patient should be independent with the exercise program and also understand the importance of being diligent with it. Educate your patient so they understand these exercises will require a lifestyle change.

3. The patient should be able to tolerate a minimum of 30 minutes of physical activity.
4. Following sufficient soft tissue mobilization, the patient should be able to tolerate pressure and tissue displacement on the distal end and incision without pain.
5. The incision should be fully healed and good soft-tissue mobility should be established.
6. It is imperative that patients continue an independent exercise program even after prosthetic gait training has been initiated. Preferably, the patient will continue their exercises on their own outside of therapy so that therapy appointments can focus on gait training. This will encourage further muscle development that will supplement any gait training conducted during regular therapy appointments.
7. They should be independent with transfers and bed mobility. This includes the independent ability to roll prone.

What is Possible?

Trans-femoral (above the knee) patients are more challenging and only small percentages ever achieve a natural and efficient gait without the use of a walker or cane. While there are significant physical limitations that affect a patient's trans-femoral rehabilitation, the psychological limitations can be far more challenging. A patient's personality, and their ability to accept risk, determines their ultimate outcome regardless of how much therapy they receive. For instance, a person that has a confident risk-taking personality tends to excel with a trans-femoral prosthesis versus a person that has lower confidence and feels uncomfortable taking risks. The mechanical challenge of walking with a trans-femoral prosthesis is risky and the sense of falling is always in the forefront of a patient's mind, limiting their progress.

Important Pre-Prosthetic Consideration

Over the past 20-30 years, the standard of care for amputees has evolved into the philosophy that therapists should achieve walking with an amputee patient (single leg hopping with a walker) as quickly as possible. A patient's pre-prosthetic measure of success has been determined by how many feet they can walk with the use of a walker, but without a prosthesis. This standard of care, compounded by the belief that there is little a therapist can do with a patient without a prosthesis, is leading to less favorable limb loss outcomes.

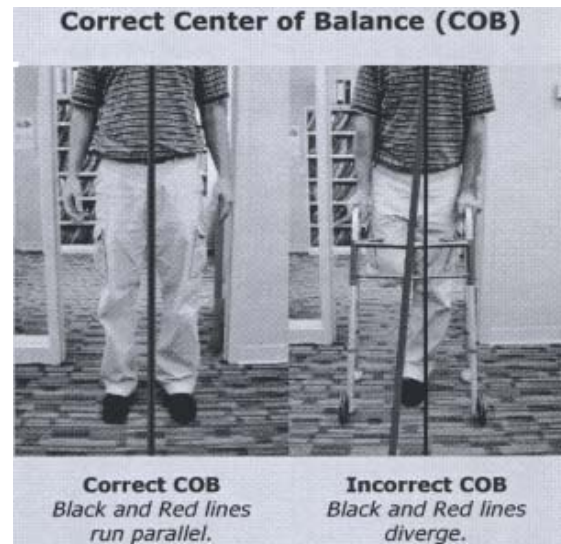
We support a different philosophy that we feel promotes better limb loss outcomes. The following information will provide you with an alternative method of treatment that we have found to produce better patient outcomes. This philosophy not only stems from the teachings of Robert Gailey, PhD, PT, but also from the unique experience we have gained by treating this patient population exclusively.

NO SINGLE LEG HOPPING WITH A WALKER!!!

1. Puts excessive stress/strain on sound limb.
2. Puts the patients Center of Balance (COB) over sound limb (see below).

Center Of Balance (COB)

Maintaining proper COB over *both* extremities is essential for developing proper prosthetic gait (see picture). By maintaining COB awareness, the patient maintains their minds inherent ability to perceive where their amputated limb is in space, or proprioception. Walking (hopping) and standing with a walker automatically requires the patient to shift their COB over their sound foot. This begins to teach the patient that this is the only limb they can rely on for safe ambulation. Once the patient has received their prosthesis, they will naturally continue this habit because it is what they have learned. Alternatively, if the patient never experiences repeated COB positioning over their sound limb, they retain awareness of their amputated leg. This awareness is automatically recruited when they begin to use a prosthesis.



1. The more time a patient spends standing and hopping on one leg the more difficult (if not impossible) it may become for them to get their COB over both extremities when they begin to wear a prosthesis.
2. Failing to maintain a natural COB awareness will prevent the patient from achieving their full potential. Please discourage walking until your patient receives their prosthesis. It is better for a patient to not walk at all versus single leg hopping.

Instead of single leg hopping, pre-prosthetic therapy should focus on:

- Flexibility
- Contracture management
- Both core and lower extremity strengthening
- Bed mobility
- Health/mobility of incision

Amputee Exercises

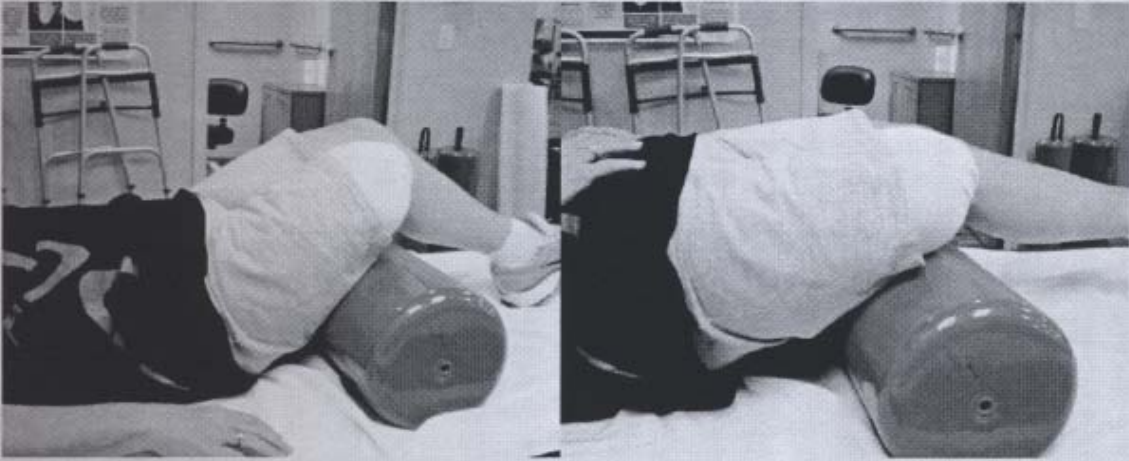
This manual is a basic guide that will initiate pre-prosthetic training. It is important that patients develop good muscle strength and joint flexibility to promote a safe, efficient and natural prosthetic gait. The exercises contained in this section are a comprehensive guide to treating a patient's loss of a limb. They are not meant to be a guide for treating the patient's other deficits that may hinder rehabilitation.

These exercises should be initiated during the post-op treatment of an amputee, continued as an out-patient pre-prosthetic protocol, and then used as a home exercise program.

Exercise Instructions

After a thorough evaluation, the therapist will need to establish an initial number of repetitions per exercise for each individual patient.

Bridging Over Bolster



Lay on your back with your legs over the roll. Contract your gluteus muscles and straighten your legs to lift your hips off the ground. Be sure to lift both hips equally using gluteus muscles – NOT your back muscles.

Repetitions

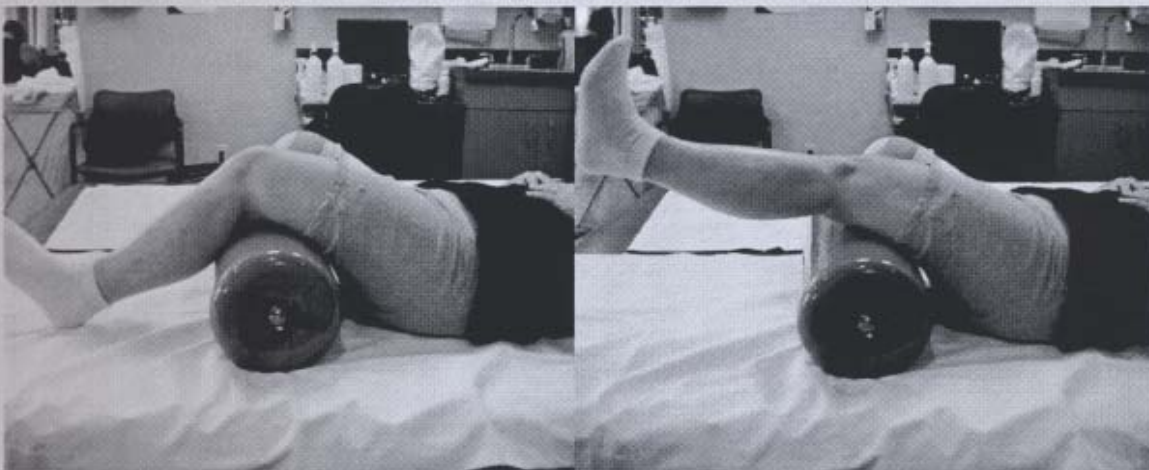
Single Leg Bridging



Lay on your back with one leg on the roll while extending the other leg in the air. Contract your gluteus muscles and straighten your legs to lift your hips off the ground. Be sure to lift both hips equally using gluteus muscles – NOT your back muscles.

Repetitions

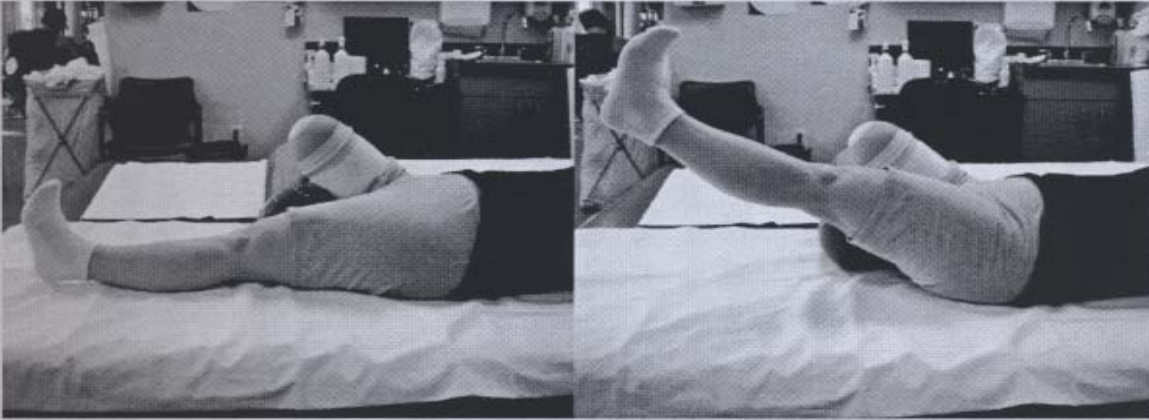
Short Arc Quadricep



Lay on your back with both legs over the roll. Straighten your leg while keeping it on the roll. Be sure to keep your foot in a neutral alignment, with your toes pointed back throughout the exercise.

Repetitions

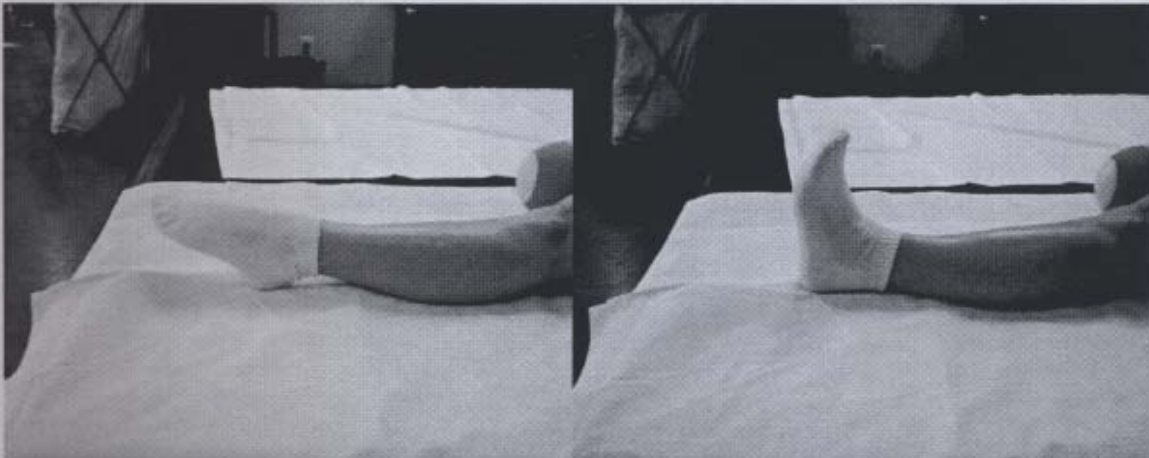
Straight Leg Raise



Lay on your back with your sound leg fully extended on the ground in front of you. Place your other leg on the roll. Keeping your sound leg straight, raise it up until it is the same height as your the leg over the roll. Hold this position for a count of 3 seconds before returning to the starting position. Relax the quadricep for a count of 2 seconds and repeat. Be sure to keep your knee straight, your foot in a neutral alignment, with your toes pointed back throughout the exercise.

Repetitions

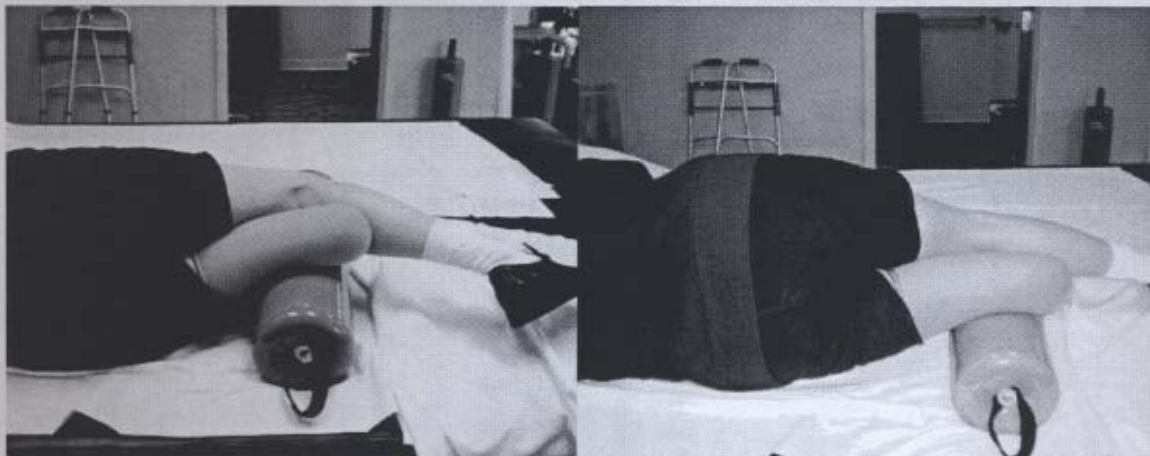
Ankle Pumps



Lie on your back with your legs extended out in front of you. Keeping your foot in neutral position, point your toes away from you, pause, and then bring your toes back towards your head as far as you can. Repeat.

Repetitions

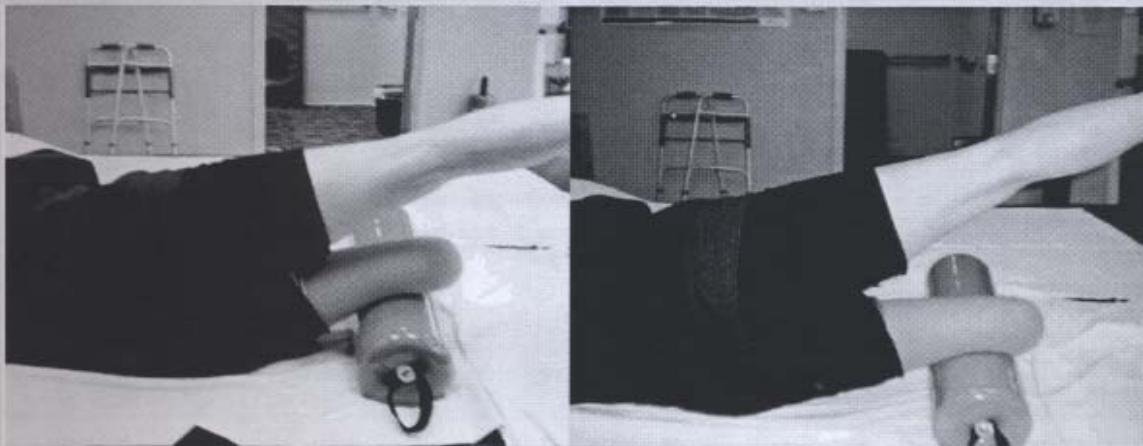
Side Lying Hip Abduction - Modified



Lay on your side. Make sure your body is a straight line with your legs fully extended over the roll. Contract your gluteus muscles and lift your hips off of the bed. Hold your hips off the ground for a count of 3 seconds and return to the starting position. Be sure to stay on your side throughout the exercise without rolling forward or backward.

Repetitions

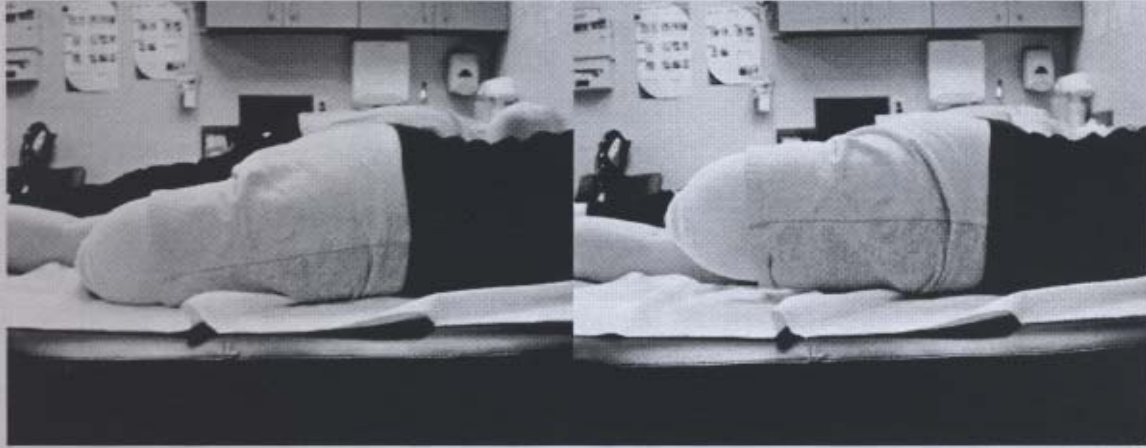
Side Lying Hip Abduction - Advanced



Lay on your side. Make sure your body is in a straight line. Fully extend your bottom leg over the roll, while elevating your top leg directly above it. Contract your gluteus muscles and lift your hips off the ground for a count of 3 seconds before returning to the starting position. Your top leg should remain elevated over the bottom leg for the duration of the exercise. Be sure to stay on your side throughout the exercise without rolling forward or backward.

Repetitions

Prone Hip Extension



Lay on your stomach. Lift your leg off the ground. Be sure to keep your body flat on the ground throughout the exercise and do not arch your back. Only lift your leg as high as you can without raising your hip of the ground.

Repetitions

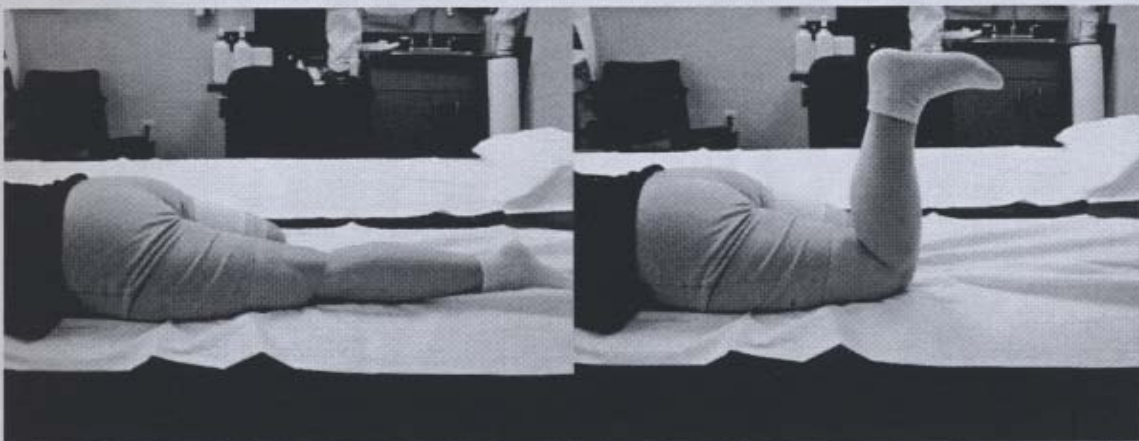
Prone Hip Extension (Sound Limb)



Lay on your stomach with your knee bent at a 90° angle. Keeping your knee bent, lift your leg off the ground. Be sure to keep your body flat on the ground throughout the exercise and do not arch your back. Only lift your leg as high as you can without raising your hip of the ground.

Repetitions

Prone Knee Flexion



Lay on your stomach with your legs fully extended behind you. Bend your knee as far back as you can without lifting your hip or arching your back. Then lower your leg back down to starting point in a controlled motion. Be careful to keep your knee pointed straight into the mat without rotating your lower leg. Repeat on both sides.

Repetitions

Prone Abductor Squeeze



Lay on your stomach with your legs fully extended behind you. Place the roll between your legs and squeeze for a count of 5 seconds. Relax and repeat.

Repetitions

Push-ups



Lay on your stomach with your knees on the ground. Place your hands down in front of you (shoulder-width apart). Lower yourself to the ground and pause. Extend your arms to lift your upper body back to the starting position and repeat. Keep your hips down and stomach tight throughout the exercise. Do not arch your back.

Repetitions

Quadruped Leg Lift



Get on your hands and knees with your hands placed directly under your shoulders and your knees directly under your hips. Keeping your body still, pull your belly button towards your spine and hold. Keeping your back flat, raise your leg, pause, and return to the starting position. Repeat on both sides.

Repetitions

Abdominal Curl-up



Lay on your back with your legs fully extended in front of you. Raise your arms straight in front of your chest. In a controlled manner, roll up to sitting position until you reach the end of your physical range. Return to the starting position in a controlled manner, one vertebrae at a time. Repeat.

Repetitions

Repetitions

Bosu Head Twists



Sit on the bosu and balance in a upright position with your hands in your lap. Rotate your head from side to side in a controlled manner. Next, raise head and lower your head in a controlled manner. Repeat. Be sure to maintain an upright posture throughout the exercise. Do not use your sound side leg to balance on the ground.

Repetitions

Repetitions

Bosu Ball Exercises



Sit on the bosu and balance in an upright position. Grasp a weighted ball with hands. Be sure to maintain an upright posture throughout the exercises.

1. Starting in a downward position, raise the ball directly over your head, pause, and return to the starting position in a controlled manner. Repeat.
2. Starting with the ball at one side, raise your arms across your body and above your head, pause, and return to the starting position in a controlled manner. Repeat on both sides.
3. Starting with ball directly in front of your chest, rotate from side to side in a controlled manner while maintaining an upright position.

	Repetitions
	Repetitions
	Repetitions