

**Trunk Strengthening and  
Muscle and Coordination Exercises  
for Lower Limb Amputees**

## Part One: Trunk Strengthening

### Trunk Extension

**Needed:** Sturdy chair or stool, Theraband, and a Theraball if necessary.

**How to do the exercise**



- Sit on chair.
- Hold Theraband with both hands and pin the middle of the band to the floor with the contralateral foot.
- To begin the exercise, hold the hands at hip height with the band under slight tension.
- Lift both arms simultaneously upwards to increase tension in the band.
- At the same time, open the trunk upwards.
- The quadriceps should also engage here.
- During repetitions, maintain tension in the Theraband.

- **Variations:**

- Use a heavier band or use a shorter length of band for increased tension.
- Perform the same exercise on a Theraball.

**Goals:**

- Extension of torso
- Strengthening of back musculature

## Horizontal Support

**Needed:** Mat or towel, if necessary, a stability trainer

### How to do the exercise



- Starting position: Support on knee(s) and elbows.
- Keep Elbows and knee(s) at 90 degrees.
- Lower the upper body forward and down. While doing this, stretch out the leg and bend the elbows.
- The upper body should slowly come forward.
- At end, push buttocks back into the starting position.
- Do not relax.
- During the entire exercise, keep the stomach engaged and do not let the back sink down.

### Variations:

- Lower arms in stability-trainer position.

### Goal:

- Strengthening of the biceps and triceps.
- Strengthening of the chest muscles.
- Strengthening of the trunk (stomach and back) muscles.

## Stomach See-Saw

**Needed:** Sturdy chair

### How to do the exercise



- Sit as far forward on chair as possible.
- Keep the knee and hips at 90 degrees.
- Bring the body's center of balance backwards.
- Maintain the angle between knee and hip, so that the leg lifts off the floor.
- Now bring the body's center of balance back to the start position.
- Breathe in when rocking the body backwards; breathe out when setting the foot back on the floor.

### Variations

#### Static version:

- Rock the body's center of balance backwards and then hold this position.
- The further the trunk is brought back, the more difficult this exercise becomes.
- In this static position, it is more difficult to breathe.
- Hold for 5 x 5 seconds.

#### Goal:

- Strengthen stomach muscles.
- Extension.

## Bridging

**Needed:** mat or towel; if necessary, water bottles.

### How to do the exercise



- Starting on the back, angle the knee and hip.
- Place the heel of the foot in the approximate middle of the pelvis.
- Stretch the arms out to either side.
- Lift the pelvis upwards until the hip is extended.
- Only the shoulders, arms and heels should be touching the mat.
- Hold in tension for a moment, then lower.
- After lowering, do not set the pelvis on the mat, but immediately raise it back up, hold briefly, and lower.

### Variations

- To make more difficult: lift both arms towards the ceiling during the exercise. To make even more difficult, water bottles or weights can be held in the hands.
- Move the arms with short, back and forth movements.
- Lay the arms on the mat and increase the tension before lowering the pelvis back to the mat.

### Goals

- Strengthen the trunk musculature.
- Stretch the hip flexors.

## Diagonal Sit-Ups

**Needed:** Mat or towel, a water bottle if necessary.

### How to do the exercise



- Lie on your back.
- Lift your leg and bend at knee—but do not set on floor.
- Stretch one hand upwards and set down next to head.
- This counterbalance is used to avoid having the stabilizing side of the body be shortened.
- Lift the back of the hand of the opposing side and push the outstretched arm past the opposing leg.
- Follow the hand movement with the head and allow head to come up off the mat.
- While doing this, the upper body will slightly weight the opposing side of the pelvis.
- The other arm can stabilize the position by pressing into the floor.
- Slowly return the upper body back to the mat, without lowering the head.
- Pay attention to breathing during this exercise.

### Variations

- Do not use the arm stretched out on the floor for stabilization.
- Hold a water bottle in the hand to make more difficult.

### Goal

- Strengthening of the side muscles.

## Part Two: Muscle and Coordination Exercises

### PNF Diagonal

**Needed:** Theraband.

**How to do the exercise**



- Hold Theraband to the floor with the prosthetic foot and hold other end with contralateral hand.
- The contralateral hand should be at hip height.
- The Theraband in this starting position should be under slight tension.
- Next, lift the contralateral hand diagonally upwards and outwards.
- Follow the hand with the eyes.

**Variations:**

- Increase difficulty: Hold a shorter length of Theraband or use a heavier Theraband.
- Stand before a step (or low block) and tap the free foot on the step while doing the exercise.
  
- **Goals:**
- Extension of torso.
- Training of the support leg.
- Strengthening of the obliques and back muscles.

## Back Extension

**Needed:** Wall or closed door; Theraball if needed.

### How to do the exercise



- Stand facing a wall or closed door.
- Alternating hands, push one hand up while letting the other come down.
- Avoid leaning too far to either side.
- The Therapist should control and correct this motion to maintain a stable trunk extension.

### Variations:

- Unsupported by wall, use both arms to hold a Theraball over the head.
- Alternate raising one arm upwards, then the other.
- The centerpoint of the ball should remain stable.

### Goal:

- Extension of the trunk.
- Training of the support leg.
- Strengthening of the stomach and back muscles.

## Strengthening of Support Leg

**Needed:** Stair tread or box; Theraband if needed.

### How to do the exercise



- Stand near or before a step (or low block) and tap the free foot on the step without weighting it.
- Then tap the foot at the starting position.
- At the beginning, hold on to a railing or other support.
- This exercise can also be done by tapping the foot to the side, as shown in the above photos on the right.

### Variations

- Increase difficulty: stand free (without holding on to support) during the exercise.
- Move the arm dynamically while doing the exercise.
- Use Theraband while doing exercise (as shown above in 'PNF Diagonal').

### Goal:

- Training of the support leg.
- Balance training while on the prosthesis.
- Strengthening of the stomach and back muscles.
- Strengthening of trunk muscles.

## Balance Training 1

**Needed:** Tape, low balance beam.

### How to do the exercise



- It's important to have a good sense of balance with the prosthesis to increase stability during stance phase (when the prosthesis is weighted during walking).
- For this reason, we recommend sideways and forwards balance exercises.
- During the forwards balance exercise, the advantages of rotation in the hip joint are noticeable.
- Begin the exercise with tape lines on the floor.

### Variations

- Cross over: during forwards balance exercise, cross one leg in front of the other.
- Increase height of balance exercise, such as with a low balance beam (always perform with therapist support).
- Taped cross:
  - Learn to react with prosthesis,
  - Perform different movements, with the foot being placed on various positions within the cross (above right photos).

### Goals

- Training of the support leg.
- Improve coordination and balance.
- Practice changing direction.

## Balance Training 2

**Needed:** Balance board, balloon; if needed: balance trainer, non-slip mat.

### How to do the exercise



- Place balance board between P-bars.
- Therapist and prosthesis-user should simultaneously stand on either end of board.
- The therapist should control the movements, with the patient reacting.

### Variations

- Play with a balloon while standing on balance board.
- Walking on the balance board:
  - This is a very good exercise for maintaining balance on the prosthesis,
  - It's important to stabilize the balance board during this exercise.
- A balance trainer can also be used here:
  - This is freely moveable in all directions,
  - For safety, always use on a non-stick mat.

### Goal

- Improve balance.
- Training of the support leg.