

## **Lower Extremity Exercise**

**Department:** Mobility and Fitness

**Priority:**

High priority for students who walk independently or with assistive devices and have the potential to fall.

**Overall purpose of class:**

1. Improve trunk and lower extremity strength and flexibility.
2. Improve weight bearing in upper and lower extremities.
3. Improve balance in quadruped (all fours) and upright kneeling positions.
4. Improve floor mobility and transfers.

**Number of classes held per week:**

Daily

**Optimum class time:**

Mornings because of fatigue factor

**Instructor requirements:**

1 Physical Therapist

**Number of students:**

10 is ideal, but class size is somewhat dependent on room space and the number of mats that are available.

**Student ability range and limitations:**

Students must be fairly independent in ambulation. Assistive devices are fine, but the class is not appropriate for students who are dependent on wheelchairs.

**Space and Equipment requirements:**

Room must be sufficiently large to accommodate all students laying on mats. Mats, plinth, full size wall mirror, pillows and belts are needed.

**Student Needs to be met from the perspective of the instructor:**

1. Practice in reciprocal actions
2. Strength
3. Coordination
4. Flexibility
5. Need instruction and practice in rolling
6. Need to learn to safely get up from the floor in their home environment

## **Typical Student Goals that lead to placement in the class:**

Students are placed in this class who indicate that they are concerned about weakness in their legs, who want to be able to get up from the floor by themselves if they should fall and/or who want to improve their walking skills.

## **Sample Activities Lower Extremity Exercise**

Prerequisites: Student must be able to walk independently (no "yellow ribbon" students) and to transfer to/from the floor with stand-by assistance. Students may use a chair, bench or parallel bars to assist with transfers.

### General Rules For Teaching:

- Stand or sit in front of the class in order to observe students' performance including proper positioning, breathing problems, pain etc. Get down on to mat to demonstrate and/or assist individual students only as needed.
- Be specific in instruction, using as few words as possible, and demonstrating as necessary.
- Repeat each exercise at least 4-5X. You may need to start with fewer repetitions initially and then be able to build up to more than 5 as the semester progresses.
- Remind students to pace themselves. Encourage students to rest when needed and to join back in with the rest of the class when they are ready
- Exercises should be done slowly and with good control.
- Exercises may be done alternating right then left legs OR to make the exercises more challenging repeat all on one leg, then the other.
- Remind students to breathe during exercises, especially when performing abdominal strengthening exercises. Exhale during the most stressful part of the exercise to prevent straining.
- Instructor should never force any of the movements when assisting a student. Assist to improve control, speed, or direction of the movements only.
- Watch students carefully when getting up and down from the mats. Students may use parallel bars, bench or chair to assist with transfers.

### Exercises:

- Stretches (done in supine). All stretches should be held for at least 10 seconds.
- Gradually increase the amount of time the stretches are held as the semester progresses.
- Hip Flexor Stretch: Grasp the back of the knee with both hands (if possible) and pull the thigh to the chest as far as possible. Keep the thigh of the opposite leg down flat on the mat with the toes pointed toward the ceiling. Tighten the knee and straighten the leg as far as possible. Repeat with opposite leg.
- Hamstring Stretch: Bring the knee up toward the chest until it is pointing

straight up (or as close as possible). Grab the back of the knee with both hands and straighten the knee to the point of tightness, raising the foot up in the air. Repeat on other leg. Encourage students to keep head and upper body relaxed on the mat and lower back flat (pelvic tilt). The opposite knee may be bent if the student is still too uncomfortable. Students may also use a towel or belt around the thigh to extend their reach.

- Adductor Inner Thigh Stretch: Bend both knees keeping the feet flat on the floor. Slowly drop the knees to the side, allowing the soles of the feet to turn in towards each other.
- Knees to Side Twist: Same position as above, but also extend the arms out from the shoulders in a "T" position. Roll the knees from side to side gradually increasing how far the knees move toward the floor. Next, maintain the knees as far to one side as possible, while keeping the upper body flat on the mat. Hold for at least 10 seconds, then move knees to the opposite side and hold. For more of a stretch, turn the head to the opposite direction of the knees.
- Knee Hug Lower Back Stretch: Bend the knees toward the chest, encircle them with both arms and gently pull the knees toward the chest, stretching the low back and sacral areas. If the abdomen is bulky, part the knees. Slowly and with good control, rock the body from side to side.
- Upper Body Stretches: Clasp the hands together with hands resting on the chest. Stretch the arms straight up toward the ceiling, stretching the muscles between the shoulder blades. Arms may also be move up toward the ceiling on a diagonal, overhead, or in a circle.

## Strengthening Exercises

### Exercises In Supine

- Pelvic Tilt: With the feet flat and knees bent, flatten lower back into the mat by tightening the stomach and buttock muscles.
- Pelvic Tilt with One Arm Raise: Maintaining a pelvic tilt, raise one arm overhead, then slowly lower it to the floor. Repeat with the opposite arm.
- Pelvic Tilt with Double Arm Raises: Maintaining a pelvic tilt, raise both arms overhead. Return arms slowly to the floor.
- Pelvic Tilt Stabilization: Maintaining a pelvic tilt, slowly slide one leg up towards the buttocks. Slowly straight the leg as far as possible while keeping the back flat on the mat. Repeat with the opposite leg.
- Start with both legs extended straight out. Bend one knee up towards the chest; return slowly back to starting position.
- Same as #5 but alternate legs as if peddling a bike. Keep low back flat on the mat throughout exercise.
- Straight Leg Raise: Bend one knee to keep the back flat. Tighten the quadriceps (thigh) muscle on the opposite leg to straighten the knee. Slowly lift leg up off the mat about one foot. Hold for 3-5 seconds, slowly lower leg to the floor.
- Bend one knee to flatten the back. Lift the opposite leg about one foot off of the floor. Bring the leg out to the side while keeping the foot pointing straight up; bring

leg back in and then down onto the mat.

- Bridging: Bend knees, feet flat on floor. Raise hips slowly off the floor; hold for a few seconds, then slowly lower the hips to the floor "one vertebrae at a time". Hips should be equal height off the floor.
- Partial Sit-ups: Knees bent with feet flat on the floor and arms folded across the chest or resting behind the head. Do a pelvic tilt and then slowly raise head and shoulders up off the mat, keeping the head in line with the body (do not curl neck). Slowly lower upper body back to mat. If the student supports the head with the hands, instruct them to keep the eyes focused on the ceiling to prevent neck curling. Encourage students to exhale on the way up and inhale on the way down to prevent straining.
- Partial Sit-ups with Rotation: Same as #7 but as head is raised, bring shoulder toward opposite knee, alternating side to side.

Exercises In Sidelying (Use a pillow under the head for these exercises.)

Do exercises 1 and 2 on one side, then roll onto the other side and repeat.

- Roll onto one side. Bend the hip and knee of the bottom leg while keeping the top leg straight and in line with the body. Raise the straight leg up towards the ceiling about one foot, hold for a few seconds, then slowly lower back down.
- Sidelying as in #1. Bend the top knee bringing it up towards the chest; slowly straighten the knee and hip bringing the straight leg slightly behind the body. (The top leg makes a circular or cycling type motion during this exercise).

Exercises In Prone (Use pillow or folded towel under forehead as needed. Students may also prefer a pillow under their hips or may lie with their extended arms under the hips to form a protective "V" with the wrists together, hands fisted or open.

- Prone Relaxation: Lie face down with arms relaxed and head in a comfortable position.
- Position legs out straight with the hips flat on the mat.
- Prone on Elbows: Lie on the stomach with hips flat, legs extended and elbows straight down under the shoulders (propped up on elbows). Make sure the weight is equal on both arms. Push the elbows down into the mat (as if doing a push-up) lifting the chest and extending the upper back. Keep the eyes focused down toward the mat to avoid overly extending the neck. Slowly lower the chest down between the shoulders.
- Same as #1. Keeping the leg straight, raise it up off the floor, hold, and then return to the floor.
- Same as #3 but bend the knee to a 90 degree angle before lifting the thigh off of the floor.
- Hold, and then return to the floor.
- Keeping the thigh on the mat, bend the knee moving the heel towards the buttocks as far as possible. Hold, and then slowly lower foot back to the mat while keeping the lower leg in line with the upper leg. Keep the buttocks flat on the mat as the knee bends.

### Exercises On Hands And Knees Or Elbows And Knees

- Students may do the following exercises on hands and knees or elbows and knees. Make sure the hands (or elbows) are positioned straight down under the shoulders, and the knees are positioned straight down under the hips. The back should be as flat as possible unless otherwise stated.
- Mad Cat: (Spine Stretch) Stretch the muscles along the spine by arching the back to round the spine while the head hangs down. Next, raise the head while allowing the waist to sag towards the floor.
- Weight Shift Forward and Backward: Gently and slowly rock the weight forward over the arms and backward toward the heels gradually increasing the distance of the weight shifting. Next, when the weight is shifted back toward the heels as far as possible, hold the position to stretch the spine and shoulders.
- Bend the knee to a 90 degree angle then lift the leg up towards the ceiling. Hold then slowly lower back to the mat.
- Slowly kick the leg back towards the wall, straightening the knee. Hold and then return to the starting position.
- Balance on Hands and Knees: Alternate lifting one arm and then the other while maintaining balance. Next, alternate one leg and then the other, extending the leg back toward the wall.
- Same position as above. Lift opposite arm and leg while maintaining balance. Stand by and assist students one at a time as needed.
- Lift one leg up and out towards the side while keeping the knee bend at a ninety-degree angle.
- Slowly lower to starting position.

### Exercises In Kneeling

- Students may use parallel bars if needed for balance during the following exercises. Make sure that the hips are fully extended, back straight (no bending forward from the waist) and weight equal on both legs.
- Weight Shifting: Shift the weight side to side, then forward and back.
- Weight Shifting with Hip Rotation: Shift the weight to one side, while slowly lowering the hips part way down to the floor (as if moving into side-sitting). Bring hips up to fully extended position, then rotate the hips towards the opposite side. Return to starting position.
- Half-Kneeling: Bring one knee up placing the foot on the mat below the knee. Return knee to starting position. Repeat with the opposite knee.
- Half-Kneeling with Weight Shifting: Same position as above. Weight shift forward to stretch the front of the thigh. Hold, and then return to starting position.

### Additional Floor Mobility Activities

- Rolling both directions
- Crawling along the length of the mat.
- Knee Walking: Parallel bars may be used to assist with balance.
- Scooting: In a sitting position, bend the knees then push the body backward on

the mat by pushing with the arms and legs as the hips lift off of the mat. Repeat going forward.

- Hip Walking: In long leg sitting raise the buttocks from side to side while moving the legs forward. Repeat going backward.
- Long-leg Sitting: (Hamstring Stretch) Sit with legs extended at the knees while keeping the back as straight as possible. Students may place their arms behind them to help support their backs as needed. One leg may be held straight at a time if keeping both legs straight at the same time is too difficult or uncomfortable. This may also be done by sitting with the back straight against a wall.
- Practice moving from hands and knees to side-sitting position, alternating sides if possible.
- Practice floor to standing transfers. Students may use parallel bars, bench or chair to assist.