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Stretching the Major Muscle Groups of the Lower Limb

In this chapter, we present appropriate stretching exercises for the major muscle groups of the lower limb. All four methods (3S, yoga, slow/static, and dynamic) are covered.*

The method referred to as passive partner stretching (Figures 1-9 and 1-10) is often used in therapeutic settings. We do not recommend its use in recreational activities, fitness programs, or in sport, and is omitted from this and the following chapters on general stretching exercises. For more on therapeutic stretching techniques, see Chapter 9.

*Exercises to be done on both limbs.

Exercise 1—Hip Extensors (3S Method)

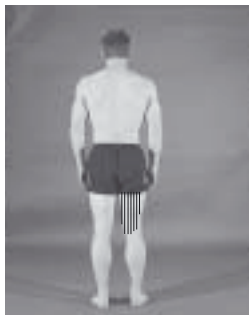


FIGURE 2-1. Muscles to be stretched (biceps femoris, semimembranosus, semitendinosus, and gluteus maximus). It should be remembered that isometric contractions of 60% maximum voluntary isometric contractions (MVIC) or greater will maintain the isometric strength capabilities of the muscle group being stretched (agonist).

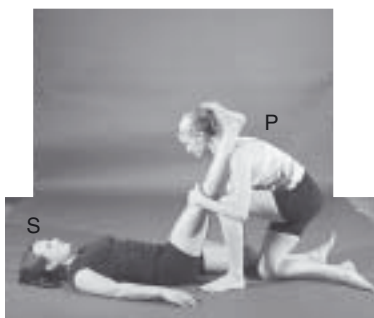


FIGURE 2-2. 3S hip extensor stretch (position and initial phase of exercise). The individual being stretched (S) is lying on his/her back, with one leg on the floor, the other leg raised as high as possible, (pain free) both legs remain straight throughout the exercise. The partner (P) is on one knee, with the opposite foot on the floor and the shoulder against the back of the exercise leg. P holds the non-exercising leg to the floor.



FIGURE 2-3. 3S hip extensor stretch (position and middle isometric phase of exercise). During the isometric phase, S contracts the hip extensors/hamstrings against P. That is, S attempts to push his/her raised leg to the floor. P resists this effort, causing an isometric contraction. After a 4-second build-up and a 6-second submaximal contraction, S relaxes the hip extensors/hamstrings (2 seconds).



FIGURE 2-4. 3S hip extensor stretch (position and end phase of repetition 1). Next, S pulls the leg (hip flexion) toward his/her head by concentrically contracting the hip flexors. P assists with light pressure (reposition phase). This takes 3 seconds, for a total of 15 seconds. The hip extensors/hamstrings are in the new lengthened position. Repeat the procedure 3 times from the new lengthened positions. 4 reversal of antagonists, each taking 15 seconds, are performed, for a total of 60 seconds.

Exercise 1—Hip Extensors (Alternative Methods)

FIGURE 2-5. Yoga stretch. From a kneeling position, slowly assume the posture depicted. Perform a series of slow inhalations/exhalations, stretching further with each exhalation (30+ seconds).



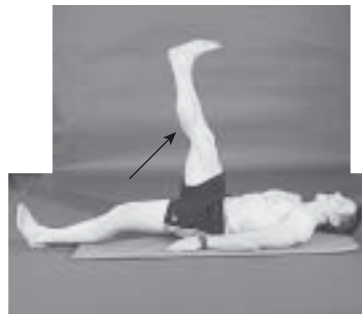
FIGURE 2-6. Slow/static stretch. S is lying on back (knees, back, and head are supported). In a slow and smooth motion, S flexes at the hip the (straight) leg to be stretched (direction of arrow). The hands (or towel) are placed behind the hamstring for support. S moves the leg as far as possible (pain free). S holds end position for 30+ seconds, then returns to the initial position. S repeats the above procedure on the opposite side. A total of 3 stretches per side are performed. Note: do not move the head forward during the motion.



FIGURE 2-7. Dynamic stretch (start and finish position of exercise). From supine position lying flat on mat.



FIGURE 2-8. Dynamic stretch (position at full stretch). Flex one hip at the desired speed to end of range. Return to start and repeat (5 to 10 reps).



Exercise 2—Hip Adductors (3S Method)



FIGURE 2-9. Muscles to be stretched: adductor brevis, adductor longus, adductor magnus, gracilis, and pectineus).



FIGURE 2-10. 3S hip adductor stretch (position and initial phase of exercise). S is sitting with ideal back posture, legs straight and as far apart as possible. P is positioned in front of S, resting on one knee with the opposite foot on the floor, holding both S's legs above the ankles.



FIGURE 2-11. 3S hip adductor stretch (position and middle isometric phase of exercise). S attempts to bring her/his legs together (adduct hips), knees remain straight, limbs remain in neutral position, back posture is maintained. P resists.



FIGURE 2-12. 3S hip adductor stretch (position and end phase of exercise). After the 4-second build-up and a 6-second submaximal isometric contraction, S relaxes for 2 seconds, then spreads his/her legs (abducts hip joints) 3 seconds. P assists with light pressure. The hip adductors are in the new lengthened position. Repeat the procedure 3 times from the new lengthened positions.

Exercise 2—Hip Adductors (Alternative Methods)

FIGURE 2-13. Yoga stretch. From sitting position, slowly assume posture depicted. Perform a series of slow inhalations/exhalations, stretching further with each exhalation (30+ seconds).



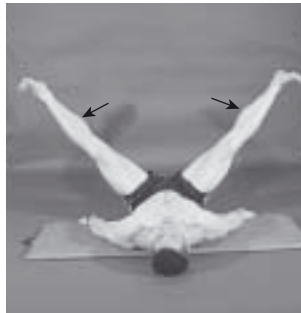
FIGURE 2-14. Slow/static stretch (position of exercise). S is sitting maintaining an ideal posture. In a slow and smooth motion, S spreads (direction of arrows), legs as far as possible (pain free). S holds end position for 30+ seconds before returning to initial position. S repeats the procedure 3 times.



FIGURE 2-15. Dynamic stretch (start and finish position of exercise). Lying supine, hands by side, legs vertical.



FIGURE 2-16. Dynamic stretch (position at full stretch). Abduct both legs simultaneously at the desired speed (5 to 10 reps).



Exercise 3—Hip Flexors (3S Method)



FIGURE 2-17. Muscles to be stretched (iliacus, pectineus, psoas, rectus femoris, and sartorius).

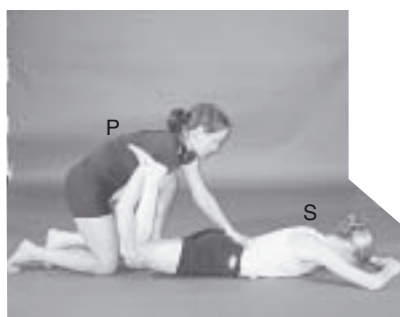


FIGURE 2-18. 3S hip flexor stretch (position and initial phase of exercise). S is lying prone with the exercise leg flexed at the knee and raised as high as possible (pain free). P is behind S, resting on one knee, with the opposite foot on the floor slightly above the left buttock, holding the lower thigh and pressing down on S's posterior pelvis.



FIGURE 2-19. 3S hip flexor stretch (position and middle isometric phase of exercise). S attempts to pull his/her knee downward to the floor. P resists.



FIGURE 2-20. 3S hip flexor stretch (position and end phase of exercise). After the 4-second build-up and a 6-second submaximal contraction, S relaxes for 2 seconds, then lifts the leg higher (3 seconds). P assists with light pressure. The hip flexors are in the new lengthened position. This increased range also involves anterior pelvic tilt and lumbar hyperextension. Repeat the procedure 3 times from the new lengthened positions.

Exercise 3—Hip Flexors (Alternative Methods)

FIGURE 2-21. Yoga stretch. Assume lunge position, arms overhead as depicted. Perform a series of slow inhalations/exhalations, stretching further with each exhalation (30+ seconds).



FIGURE 2-22. Slow/static stretch (position of exercise). S in semi-lunge position, maintaining ideal back posture. In a slow and smooth motion, S further flexes the forward leg, maintaining the back knee on the floor. The hands may be used for stability. S avoids rotating the pelvis. S moves forward (direction of arrow) as far as possible (pain free). S holds end position for 30+ seconds before returning to initial position. S repeats the procedure on the opposite side. A total of 3 stretches per side are performed.



FIGURE 2-23. Dynamic stretch (start and finish position of exercise). Normal standing posture.



FIGURE 2-24. Dynamic stretch (position at full stretch). Extend hip joint, at desired speed maintain balance by angling trunk forward (5–10 reps). Some anterior tilt and lumbar hyperextension will accompany this activity.



Exercise 4—Hip Inward (Medial) Rotators (3S Method)

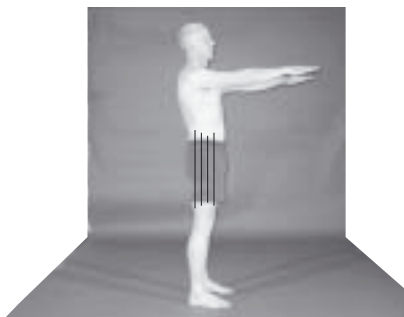


FIGURE 2-25. Muscles to be stretched (adductor magnus, gluteus medius, gluteus minimus, and tensor fascia lata). Hip architecture varies considerably. Many individuals will not achieve large ranges of motion. Most people do not need to stretch this muscle group.



FIGURE 2-26. 3S hip inward rotator stretch (position and initial phase of exercise). S is lying on his/her back, one leg straight and on the floor. The exercise leg is positioned with the thigh nearly vertical, knee flexed, and the hip outwardly rotated as far as possible. When hip is outwardly rotated and the knee is flexed, the foot moves in toward the body. P is in front and to the side of S, resting on one knee, with the opposite foot on the floor, holding the knee and ankle of the exercise leg.



FIGURE 2-27. 3S hip inward rotator stretch (position and middle isometric phase of exercise). S attempts to inwardly rotate his/her hip (tries to push his/her foot out and away from his/her body). P resists.



FIGURE 2-28. 3S hip inward rotator stretch (position and end phase of exercise). After the 4-second build-up and a 6-second submaximal isometric contraction, S relaxes for 2 seconds, then inwardly rotates his/her hip 3 seconds. P assists with light pressure. The hip inward rotators are in the new lengthened position. Repeat the above procedure 3 times from the new lengthened positions.

Exercise 4—Hip Inward (Medial) Rotators (Alternative Methods)

FIGURE 2-29. Yoga stretch. From a sitting position, assume position as depicted. Perform a series of inhalations/exhalations, stretching further with each exhalation (30+ seconds). Because of architecture variability in the hip joints, many may find this to be a difficult position.



FIGURE 2-30. Slow/static stretch (position of exercise). S is standing on one leg as shown. Knee and hip flexed to 90°, opposite hand holding exercise ankle. S holds end position for 30+ seconds, then returns to initial position. S repeats the procedure for a total of 3 stretches for each leg.



FIGURE 2-31. Dynamic stretch (start and finish position of exercise). Supine lying position, with one leg flexed at hip and knee, as depicted.



FIGURE 2-32. Dynamic stretch (position at full stretch). Externally rotate hip joint, as depicted, at desired speed (5–10 reps).



Exercise 5—Hip Outward (Lateral) Rotators (3S Method)

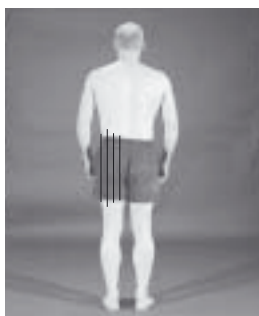


FIGURE 2-33. Muscles to be stretched (gluteus maximus, obturator externus, obturator internus, piriformis, quadratus femoris, gemelli superior, gemelli inferior, and sartorius). Stretching this muscle group is not needed by the vast majority of participants.



FIGURE 2-34. 3S hip outward rotator stretch (position and initial phase of exercise). S is lying on his/her back, one leg straight and on the floor, the exercise leg is positioned with the thigh nearly vertical, knee flexed, and the hip inwardly rotated as far as possible (pain free). When the hip is inwardly rotated and the knee is flexed, the foot swings away from the body. P is in front and to the side of S, resting on one knee, with the opposite foot on the floor, holding the knee and ankle of the exercise leg.



FIGURE 2-35. 3S hip outward rotator stretch (position and middle isometric phase of exercise). S attempts to outwardly rotate his/her hips (tries to push his/her foot in toward his/her body). P resists.



FIGURE 2-36. 3S hip outward rotator stretch (position and end phase of exercise). After the 4-second build-up and a 6-second isometric submaximal contraction, S relaxes for 2 seconds, then inwardly rotates his/her hip for 3 seconds. P assists with light pressure. The hip outward rotators are in the new lengthened position. Repeat the above procedure 3 times from the new lengthened positions.

Exercise 5—Hip Outward (Lateral) Rotators (Alternative Methods)

FIGURE 2-37. Yoga stretch. From a prone lying position, as depicted, perform a series of inhalations/exhalations, stretching further with each exhalation (30+ seconds). Stretching this muscle group is not needed by the vast majority of participants.



FIGURE 2-38. Slow/static stretch (position of exercise). S is lying on his/her back, hip and knee flexed to 90°. Hip is rotated inwardly, as shown. S holds end position for 30+ seconds, then returns to initial position. S repeats the procedure to the opposite side. A total of 3 stretches per side are performed.



FIGURE 2-39. Dynamic stretch (start and finish position of exercise). Supine lying, one leg flexed at hip and knee, as depicted.



FIGURE 2-40. Dynamic stretch (position at full stretch). Internally rotate the hip joint, as depicted, at the desired speed (5–10 reps).



Exercise 6—Plantar Flexors (3S Method)



FIGURE 2-41. Muscles to be stretched (gastrocnemius, soleus, and plantaris).



FIGURE 2-42. 3S plantar flexor stretch (position and initial phase of exercise). S is in a long sitting position, knees straight, back in ideal posture, hands grasping the ends of a towel or belt, foot and toes pulled up toward head (dorsi flexed) as far as possible (pain free).



FIGURE 2-43. 3S plantar flexor stretch (position and middle isometric phase of exercise). S attempts to point her feet (plantar flex), and resists this with her own effort.



FIGURE 2-44. 3S plantar flexor stretch (position and end phase of exercise). After a 4-second build-up and a 6-second submaximal isometric contraction, he/she relaxes for 2 seconds, then pulls his/her foot and toes up as far as possible (pain free) for 3 seconds, and assists with light pressure from towel. The plantar flexors are in the new lengthened position. Repeat the procedure 3 times from the new lengthened positions.

Exercise 6—Plantar Flexors (Alternative Methods)

FIGURE 2-45. Yoga stretch. In long sitting position, dorsiflex the ankles, as depicted. Perform a series of inhalations/exhalations, stretching further with each exhalation (30+ seconds).



FIGURE 2-46. Slow/static stretch (position of exercise). Slowly position as depicted, keeping heel down. Hold (30+ seconds), repeat twice more. Change legs and repeat.

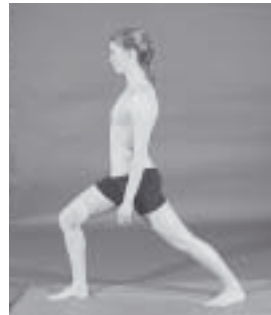


FIGURE 2-47. Dynamic stretch (start and finish position of exercise). Standing erect on step.



FIGURE 2-48. Dynamic stretch (position at full stretch). Allow gravity to drop body at the desired speed and return (5–10 reps).



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