

Handbook of  
**Assisted  
Pandiculation**

**Module 2  
Lessons for  
the  
Lower Extremities**

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## **ABOUT THE LOWER EXTREMITIES**

Ideally, in walking, the joints at ankle, knee, and foot flex around parallel, horizontal axes. This pattern of movement, which minimizes the effort of walking, permits walking to be initiated by the iliopsoas, gluteus minimus and plantar-flexors of the foot, continued by the force of gravity (by pendulum-action), and finished by active hip flexion, knee extension, and foot dorsiflexion. The musculature involved in those three motions, and their antagonists, must be free and coordinated for that easiest pattern of movement to occur -- and for there to be spring in your step!

That understood, I have invented a systematic, yet flexible lesson for the lower extremities.

### **THE LESSON SEQUENCE**

1. Internal Rotators of the Femur at the Hip
2. Deep External Rotators of the Femur at the Hip
3. Iliopsoas/Rectus Abdominis
4. Hamstrings
5. Quadriceps
6. Peroneals
7. The Lower Legs (anterior/posterior direction)
8. The Feet

The fact that the legs work reciprocally (in equal and opposite directions, simultaneously) provided an important clue for understanding the hamstrings (see Hamstring Sequence #2): the hamstrings of one leg reciprocally inhibit those of the other leg; relaxation of the hamstrings of one leg ought to be coupled with contraction of the hamstrings of the other leg. However, the hamstrings are incapable of a truly anterior-posterior movement unless the hip rotators function freely, for reasons which I will present later.



The fact that the fibula links the fibular head of the biceps femoris with the peroneals provided another important clue: Optimum balance in walking requires coordination of the hamstrings (which control flexion and rotation of the tibia at the knee) with the peroneals (which control rotation of the tibia at the ankle, and so, foot position). These two muscle groups provide an important key to balance (i.e., "grounding").

Include or omit segments of this sequence according to your client's needs.



**Heel-Out to Heel-In**  
**START**



**Heel-In to Heel-Out**  
**START**



**Heel-Out to Heel-In**  
**IN PROGRESS**



**Heel-In to Heel-Out**  
**IN PROGRESS**



**Heel-Out to Heel-In**  
**LOCK-IN**



**Heel-In to Heel-Out**  
**LOCK-IN**

## **HAMSTRING SEQUENCE #1**

Sometimes, a person gets a poor result from the standard Thigh Adductor pandiculation. People often "confuse" (misuse) the hamstrings and the adductors. Such people need to learn to use their adductors without the hamstrings. Start with standard Red Light adductor pandiculations. If your client can't separate the adductors from the hamstrings, they need a hamstring series.

Hamstrings send fibers into the medial aspect of the knee to the meniscus, according to Kapandji. Tight hamstrings (and sometimes tight gastrocs) contribute to medial knee pain.

**STARTING POSITION:** client on all-fours, hips vertically above knees, foot of active side up on toes.

**EDUCATOR:** sitting or kneeling at your client's feet

1. Place one hand outside the lateral side of the ankle and the other, behind the transverse arch of the foot (for bracing). Have your client turn heel-out. Meet, match, and resist.

**NUANCE:** Make a soft fist with the bracing hand and place the flat part of it against the foot.

**NUANCE:** Move from your somatic center and lean in the direction of your resistance. Position yourself so you can keep your balance.

2. Pandiculate from heel-out to heel-in.
3. **LOCK-IN:** Client turns heel-in; you resist.
4. Switch to the other leg. Pandiculate from heel-in to heel-out (the opposite pattern to the first leg).



# **Anterior-Posterior Hamstring Pandiculation**

**START . . .**



**IN PROGRESS . . .**



**END.**



**Rocking (higher integration)**



5. LOCK-IN: Client turns heel-out; you resist.
6. Switch legs and do the process from the opposite direction.
7. Have your client flex at the knee (lift their foot) and make a "fist" of the foot. Your hand grasps the heel; your forearm rests along the sole of their gently curled foot.
8. Instruct your client to keep their foot off the surface as they slowly lie down prone. Meet, match, and resist.
9. When they are down, release the leg.
10. With your hand at the ankle, roll their leg from side to side.
11. Switch legs.

HIGHER INTEGRATION:

Have client practice rocking forward and back 2-3". Then repeat (1.) through (11.) while rocking continuously. The rocking adds lots of sensation, which aids further release in a big way.



# Clarifying Hamstring Function: Lifting the Hip

STARTING POSITION



LIFTED



Contraction,  
Step 4



Result of Relax-  
ation, Step 5

## **HAMSTRINGS SEQUENCE #2**

### **STARTING POSITION:**

**CLIENT:** supine, knees up, feet planted, arms alongside their head, elbows bent to 90 degrees.

**EDUCATOR:** sitting next to the client's leg, facing their head

This variation uses the walking pattern to gain control of the hamstrings. Walking involves an equal-and-opposite movement of the two legs. (First version: J. R. Ward)

1. Place your client's achilles tendon on your shoulder with your head lateral to the knee.
2. Have your client press straight down on your shoulder, so as to lift their hip, slightly. Have them rehearse until they have a straight up-and-down movement. If necessary, move them the way you want them to move, so they understand.
3. Place your interlaced fingers above their knee.
4. Have your client push down firmly on your shoulder; have them slightly lift the other foot (1/4"). Meet, match, and resist.

This action engages the walking pattern.

5. Have your client ease off; as they do, have them press the opposite foot down. Take up the slack.
6. Maintain position and have them push down again. Meet, match, and resist.

Remember to have them lift the opposite foot, slightly.



**Going Up . . .**  
**STEP 7**



**STEP 8**



**STEP 11**

**Coming Down . . .**  
**STEP 12**



**STEP 13**



**STEP 14**



7. Have your client ease off; as they do, have them press the opposite foot down. Take up the slack.

Repeat until the knee is nearly straight.

8. At that point, place a hand behind their knee in the popliteal space. Their calf is still on your shoulder.
9. Instruct them to push against your hand, leaving their leg straight.
10. Have your client ease off; as they do, have them press the opposite foot down. Take up the slack.
11. Repeat until no further progress occurs. At that point, instruct them to keep their leg up in the air.
12. Place your hand above their knee and grasp snugly. Ask your client to push against your hand; meet, match, and resist.
13. Instruct your client to lower their straight leg slowly, like a drawbridge (against your resistance).

NUANCE: Remind them to push down with the opposite foot.

NUANCE: Instruct your client to stretch their heel long (dorsi-flex).

14. Once down, place your hand on your client's knee and roll their leg from side-to-side.



## **Lock-in**

### **STEP 15**

15. LOCK-IN: Place your hand under their heel, aim their foot straight up, and have them push down into your hand (backward).
16. LOCK-IN: Repeat (15.) plus have them push their upper arm into the surface.

You will feel the diagonal connection between leg and opposite shoulder, when they've got it. Ask them to repeat until you feel it.



**Quadriceps  
contraction  
STEP 2**



**Quadriceps  
relaxation  
STEP 3**



## **THE QUADRICEPS**

Once your client has mastered the hamstrings sufficiently, they will be able to turn the foreleg independent of the thigh. This ability permits them to get the most out of the following sequence. The variations in leg position reach to the different heads of the quadriceps.

### **STARTING POSITION:**

**CLIENT:** sitting on the edge of the table, preferably on their sitbones, so their feet touch the floor.

**EDUCATOR:** Slide your arm behind their thigh in a lateral direction to act as a lift and a brace.

**ADVANCED STARTING POSITION:** client propped up on their elbows or fully supine, lower legs dangling over the edge

1. Place your hand at the front fold of your client's ankle, thumb along the medial side, web across the front, fingers around the lateral side.
2. Have your client extend their foreleg. Allow them to do so, then when almost straight, meet, match, and resist.
3. Have your client ease off; take up slack all the way.
4. Place your hand behind their achilles tendon.
5. **LOCK-IN:** Your client pulls their foot back.
6. **Release:** You say, "Release." Your client releases, you straighten their leg. When it's straight, say, "Release," and let their leg fall freely. Repeat until loose.

HIGHER INTEGRATION:

1. Have your client turn their foot outward (evert and pronate).

This action involves the vastus lateralis more.

2. In that position, have them extend their foreleg.

3. Proceed as before.

4. Now, have your client turn their foot inward (invert and supinate) and proceed as before.

This action involves the vastus medialis more.

5. Now, have your client center their foot, lift their toes (dorsiflex), and proceed as before.

HIGHER INTEGRATION:

Have your client rock their pelvis.

Synchronize their pandicular contraction (knee extension) with the forward tipping (pubes back) movement and their pandicular release (knee flexion) with the backward tipping (pubes forward) movement.

You will need to get clear about this movement in yourself by practicing it so you can make sense to your client.





**Peroneals:  
Starting  
Position**

**Hand Position,  
step 3 (seated  
in alternate  
position)**



## **THE PERONEALS**

The peroneals run from the lower part of the fibula into the foot. It so happens that the upper part of the fibula runs to the Biceps-Femoris. So the Hamstrings and the Peroneals have a great deal to do with each other and with foot position; tight Hamstrings pull upon the fibula, rotate it posteriorly, and supinate the foot, affecting the Peroneals and the contact of the feet with the ground.

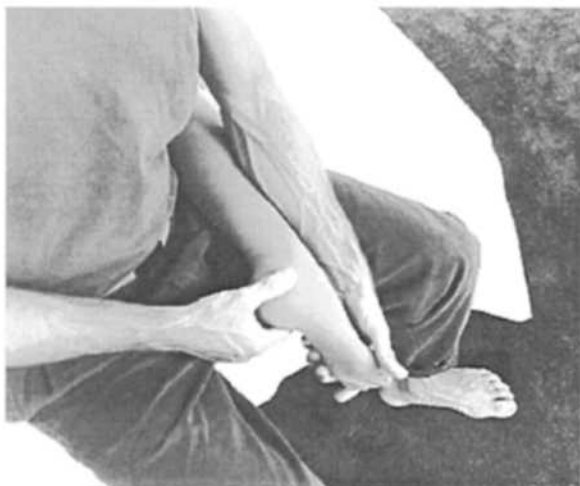
Having done the Hamstrings, therefore, you may want to do the Peroneals.

There are three Peroneals: Longus, Brevis, and Tertius. All turn the sole of the foot out, laterally. The degree of plantar- or dorsi-flexion of the foot determines which of the Peroneals works most.

**STARTING POSITION:** sidelying, the "under" knee forward, the other leg straight

1. Sit at the foot of the table, at the corner, with the leg on your lap.
2. Grasp the foot with your hand and show your client the side-to-side movement of the foot. Define "out" and "in" for them by movement.
3. Your client plantar-flexes the foot and turns the sole "out." As they do so, **FEEL THE EXACT DIRECTION OF THEIR MOVEMENT**; meet, match, and resist it. You may want to have your client repeat this move a couple of times to get an exact sense of their direction of movement.

Find a handhold that your client finds comfortable.



**Lock-in (Step 5)**



**Dorsi-Flexed  
(Step 10/11)**



**Neutral Position  
(Step 6/7)**



**Lock-in (Step 13)**



**Lock-in (Step 9)**



**Plantar-Flexed (Step 3)**

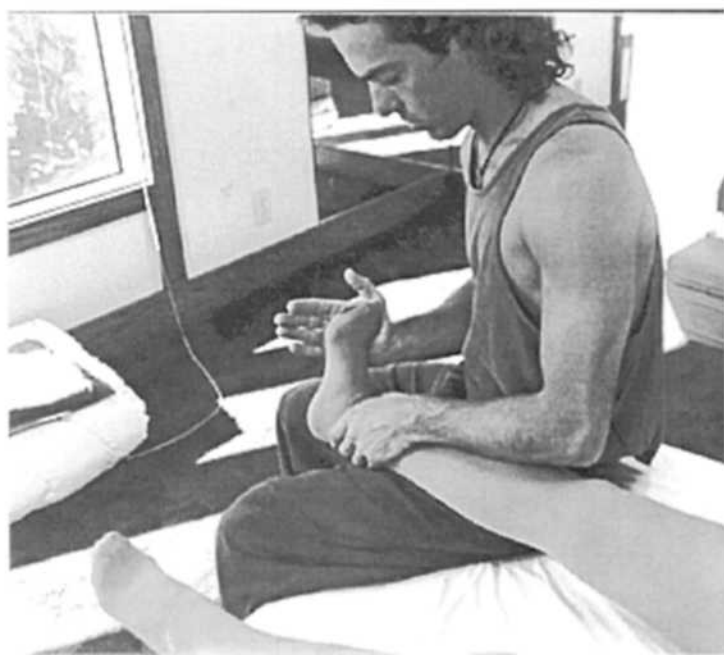
4. Your client eases off; you follow.
5. Have your client lock in.
6. Move your client's foot to a neutral position and show them "in" and "out" again.
7. Have your client turn their foot "out." Meet, match, and resist as before.
8. Your client eases off; you follow.
9. LOCK IN.
10. Move your client's foot to a dorsi-flexed position and define "in" and "out."
11. Have your client turn the foot "out"; meet, match, and resist.
12. Your client eases off; you follow.
13. LOCK IN.

**NEW POSITION:** supine

1. Sit facing the foot of the table with your client's leg on your lap.
2. Have your client plantar-flex (point their toes).
3. Reach under their sole and grasp the medial border of their foot. Your palm touches their sole.



**Ankle  
Dorsi-Flexed  
(Step 7)**



**Lock-in  
(Step 10)**



4. Your client turns their foot "in." Meet, match, and resist.
5. Your client eases off; follow.
6. LOCK IN.
7. Have your client dorsi-flex.
8. Your client turns their foot "in." Meet, match, and resist.
9. Your client eases off; you follow.
10. LOCK IN.

Invite your client to walk. Watch to distinguish the differences between the two legs.

Now, do the other leg.



Athletes Prayer . . .  
starting position

Foot Position,  
step 1



## **THE LOWER LEGS**

When the ankle is stiff, a person must lift their knee more to get foot clearance when walking, and their foot doesn't meet the ground as well. You can see it; their walking always has an adolescent, "up and down bouncy" look; it's not smooth.

This kind of walking points to tight plantar flexors -- the triceps surae (i.e., gastrocs and soleus).

If a person has pain in the arch of the foot, you have a different situation. Look to the deep flexors of the toes in the calf (crural flexors). Their functions are to grip the floor with the toes and to elevate the arch of the foot; hence, pain when stepping down.

The following maneuver gets better results than the usual athlete's stretch and can easily be taught to convince people that pandiculation works.

### **THE ATHLETE'S PRAYER FOR RELAXED CALVES**

**STARTING POSITION:** standing, hands against the wall or a post at shoulder height, one foot back, feet pointing straight-forward, head in line with the torso (not looking at the wall or looking down)

1. Have your client raise the heel of the back leg to plantar flex to the extreme, with weight through the foot.

Place the web of your thumb over the heel at the achilles tendon, so you can push down.

**NOTE:** Only extreme plantar flexion engages the soleus.

**NUANCE:** Have your client push the wall to send more force through the foot.



**step 3**



**step 6**

2. Instruct your client to grip the floor with the toes.
3. Client eases off 1/2" or so, gradually relaxing the toes.
4. Client contracts and grips the floor with their toes. Meet, match, and resist.
5. Client eases off. Repeat (2.) through (5) until the heel touches down.

NUANCE: Instruct your client to aim so the heel touches the ground squarely (on neither the outside nor inside edge).

6. When your client is down, ask them to sink into the ground and to let their foot spread.
7. Repeat.
8. Have your client walk. Observe differences between the feet.
9. Switch sides.



**START      Position 1      FINISH**



**START      Position 2      FINISH**



**START      Position 3      FINISH**



**NEW POSITION:** supine, knees up and slightly apart (2-3"), feet down

1. Sit at your client's feet.
2. Place the web of your thumb at the front fold of the ankle with your thumb along the medial surface of the foot. The fold of your palm fits their instep snugly.
3. Have your client dorsi-flex ("Lift your foot, like you were coming off the accelerator of your car.") Meet, match, and resist.
4. Have your client ease off.
5. **LOCK-IN:** Have your client stamp their foot on the table. They'll like it.
6. Slide your client's foot away from them, a little.
7. Repeat the process.
8. Repeat (6.) and (7.).



**Starting Position**



**Result of Step 3**





## THE FEET

The feet have three arches and a hinge. The three arches are the medial longitudinal arch (first three toes), which bears about 25% of the weight; the lateral longitudinal arch (outside two toes), which bears about 10% of the weight, and the transverse arch (at the ball of the foot); the remaining 65% of the weight goes to the heels. (This design of the foot resulted from millions of years of evolutionary development and resulted in the invention of the suction-cup and the plumber's friend). The hinge at the talus defines the depth of the longitudinal arches, which is controlled by the deep muscles of the calf and by the rotational movement of the lower leg (internal leg rotation goes with foot pronation). We pandiculate to recover the flexible relationship between those arches so that the feet meet the ground more securely.)

The following maneuver helps to "square" a "turned in" (supinated) foot.

**STARTING POSITION:** sitting, one knee dropped out, one knee dropped in so the sole of the "out" knee foot rests against the front of the "in" knee (see Lesson 6 of the exercises in *Somatics*.)

1. Place your hand on the lateral malleolus.
2. Have your client lift the heel by turning the lower leg. Meet, match, resist.
3. Have your client ease off.
4. Once down, have your client dorsi-flex and plantar flex ("Wiggle your foot."), with you still on the malleolus. Feel the foot reshape.
5. Repeat.

By placing your hand on the side of the heel, you can help normalize a pronated (heel out-from under) foot position.



**Arches,  
starting position**

**Lock-in, step 6**



**Arches,  
step 5**



**Arches,  
step 6**



6. LOCK-IN: Place your hand under their heel and have them press down.
7. Switch position and feet.

This next maneuver defines the relationship between the longitudinal arches.

**NEXT POSITION:** sitting up against the wall, legs outstretched (If they can't do this, they're not ready; do more, proximally!)

1. Reach around the medial side of their foot so your palm enfolds it, with your fingers underneath and your thumb on top.
2. With your fingertips, find and define (by probing, informing touch) the line between the lateral and medial arch, starting at the heel. Let your client have time to feel it.
3. Place your other hand on top (dorsal side) of the lateral arch.
4. Have the client evert the foot. Meet, match, and resist.
5. As they ease off feel the articulation between the arches fold.
6. Place the fingertips of your "top" hand under the sole of their foot; the fingertips of one hand lie next to the fingertips of the other, so together, they can create a spreading motion.



**foot fist, step 7**



**ease out, step 8**



**fold foot, step 15**



**hinge,  
starting position**



**hinge, step 1**

7. Now, have your client invert the foot and make a gentle fist with it. Meet, match, and resist.
8. As they ease off, spread the two arches apart.
9. Have them wiggle their toes.
10. Move your hands to the center of the transverse arch.
11. Have your client make a gentle "foot fist"; meet, match, and resist.
12. As they ease off, take up slack and spread the arch.
13. Now, enwrap the width of their foot with your hands.
14. Have your client spread their toes. Meet, match, and resist.
15. As they ease off, guide their foot into a fist, deepening the transverse arch.

This next maneuver defines the relationship between the calcaneus and the rest of the foot (the hinge). Use it only for high arches.

**STARTING POSITION:** sidelying

1. Grasp the foot so you can spread the calcaneus away from the arch with your fingertips.
2. Have your client point their foot and make a "foot fist."

Meet, match, and resist.



**opening the hinge, step 3**





3. As they ease off, spread the calcaneus away from the toes. Make the foot longer. Follow and guide the soft tissue.

NUANCE: Have your client wiggle their toes.