Exercise and Injury Prevention Manual for Runners

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Welcome!

Thank you for your interest in running an injury-free marathon! We have worked hard to compile a manual to safely get you started on training using our combined 20 plus years of clinical experience, education, and research.

About Us

Dr. Jessica Greaux is a sports chiropractor specializing in the treatment of runners of all abilities. Her past clients have been Olympic and Professional Marathon Runners, middle distance runners, ultra-marathoners (including a second place finish at Western States, and sprinters. She has traveled with Cal Berkeley Track and Field Team and is currently a consultant for the Cal Bears. She uses advanced video analysis software, the same software used for Olympic coverage, as well as EMG wireless technology to quickly determine the weak links and return the runner to their sport faster and more efficiently. She is also an instructor in the very effective soft tissue technique called Active Release Techniques (ART®). Dr. Greaux works at Innersport in Berkeley and Walnut Creek. [http://www.innersport.com](http://www.innersport.com)

Dr. Sandy Baird is a sports chiropractor specializing in extremity adjusting and biomechanics, Active Release Techniques, and rehabilitation. Her previous career in engineering has been instrumental in her care for runners by the way of understanding how the body works, moves, and functions. Before becoming a chiropractor, Dr. Baird was a massage therapist and has perfected her touch and technique. Dr. Baird works at Innersport in Berkeley. [http://www.innersport.com](http://www.innersport.com)

Laura Bray, MS, ART is an exercise physiologist specializing in functional movement, running rehabilitation, and Active Release Techniques. Through her ten plus years of experience, she has worked with hundreds of runners and has completed marathons and an Ironman during her career. Through her experience as an endurance athlete and her clinical expertise and knowledge, Ms. Bray continues to be a provider of choice for individuals with running injuries at Transition Fitness & Sport Therapy in San Francisco and Marin. [http://www.transitionfitness.net](http://www.transitionfitness.net)
What Causes Injuries?

1. **Scar Tissue** - Fibrotic adhesions form from repetitive motion (especially with faulty mechanics, previous injuries, occupational hazards, and poor posture.

2. **Training errors** - Too much too soon. Unfortunately, this is different for each individual. Runner specific contributing factors could be history of running and other running activities/sports, occupational hazards, weight, strength, previous injuries, etc. Training on a treadmill vs track vs trail vs concrete: This means it may not be a good idea to do all of your training on a treadmill and then run 26.2 miles on asphalt. If anything, vary the training surfaces on your recovery runs and keep your long runs on asphalt.

3. **Aberrant Biomechanics** - over striding, cross over strike, valgus/varus knee, femoral internal rotation, excessive unilateral pelvic rotation, restricted unilateral thoracic rotation, decreased hip extension, etc. – this can all be seen on video analysis. [Click here to learn more about video running analysis.](#)

4. **Wrong shoes** (this is a loaded topic...) Where to start? Recent research has shown we may not necessarily need a shoe to match our foot type and that we may just need a shoe that “feels good and fits right.” Barefoot and minimalist running has gotten a lot of press over the past couple of years. [To learn more about barefoot running click here.](#)

5. **Slow cadence** – slower the cadence, the longer the body has to absorb impact.

6. **Poor form** – (arms crossing midline of the body, bent forward at the hips, decreased knee angle, heel strike with straight knee more than 6” in front of the center of mass.)

7. **Previous Injuries** - The best predictor of a hamstring injury is a previous hamstring injury. Rehab your previous injuries. Sprain an ankle in the past? Get the ankle assessed for fibrotic adhesions and joint restrictions and start an exercise program to gain better proprioception and strength in the ankle.
Injury Prevention Tips

You Can’t Fix What You Can’t See

Not injured? Great, let’s stay that way! Here are some tips on how to run injury-free.

1. **Get a Biomechanical Assessment, EMG, and Video Analysis.** You are only as strong as your weakest link and now is the time to determine where your weak links are, and then fix them. Innersport/Press Play offers the above tests plus a range of motion exam and uses the findings to create an athlete specific exercise program.

2. **Foam Roll** at least 2x/week to “evaluate” and “treat” potential injury sites. Should you find some tightness or tenderness, these may be signs of adhesions in your muscles or tendons, roll 2x/day. If that doesn’t eliminate them, get ART now before they get worse.

3. **Core stability and strengthening:** Unfortunately, this has come to mean many things and therefore can hurt you if done incorrectly. Innersport and Transition Fitness are experts at deciding which exercises you should be doing to stabilize and strengthen best for running. Another option is to go to Pilates. See the below for some key exercise.

4. **Cross Train-** Swimming is one of the best exercises runners can do. For one, you learn how to rhythmically breath, secondly, it reinforces the cross-crawl pattern required for running. Thirdly, it stretches your body out! This is especially important if you sit all day at work and during your commute. And lastly, there’s no impact on your joints, so your joints get a rest.

5. **Stretching-** There are several different stretching techniques and it is important to know which ones to do when and for what purpose. For more information, [click here](#). Generally speaking, stretch only what is tight to neutralize imbalances.

6. **Learn Your Occupational Hazards.** Your job can ruin your running career. For instance, if you sit all day at work (and commute sitting), you will be shortening your hip flexors. Tight hip flexors cause a decrease in hip extension and thus, over striding. To avoid shortening your hip flexor muscles, get up as often as you can. Better yet, get a standing desk with a high chair/stool to give you the option to rest your hips on the edge. Try to have your hips and knees bent no more than 45 degrees for long periods of time. Several times at work and at home, stretch the hip flexors dynamically to train them to loosen functionally.

7. Heel striking is OK.
Common Running Injuries

Below is an overview of some common injuries we in runners. This is meant to be informative and not to diagnose. If you are experiencing pain, seek advice from a medical professional.

Iliotibial Band Syndrome (ITBS)
- Pain along outside of knee
- May also hear ‘squeaking sound’ with bending and straightening the leg
- Often worse when climbing down stairs or running downhill, just prior to heel strike

Patellofemoral Pain and Chondromalacia Patella
- Pain on the front of the knee and under kneecap
- Due to weak or glutes or adhesed muscles, creating inflammation/degeneration

Popliteus Tendonitis
- May feel similar to ITBS or pain may present at the back of the knee
- Sometimes aggravated when slipping off shoes, toes turning outwards or full knee extension

Shin Splints or Medial Tibial Stress Syndrome
- Lower leg pain along shin - a deep ache or sharp pain. Typically due to over striding
- If left untreated, can lead to stress fractures—more painful and localized

Compartment Syndrome
- Deep aching/cramping of leg following exercise, may initially be relieved with rest
- May also have pins and needles into same sided foot

Achilles Tendinopathy
- Soreness at the back of the ankle by the heel, usually followed by running or jumping
- May lead to a fibrous deformity (hard bump on the back of the heel)

Plantar Fascitis
- Pain on the bottom of the foot often at the heel, usually sharp
- Usually worse in the morning, especially getting out of bed

Piriformis Syndrome
- Pain or burning at the buttock, possibly radiating into the back of thigh
- May have tingling into foot of same side

Muscle strain (usually hamstrings or quadriceps)
- Usually a sudden pull or pop associated with soreness in muscle belly and pain with movement
Core Stability Exercises

The “core” refers to the muscles of both the abdominals and lower back. Together they work to maintain good posture, provide support for our spine, and keep us balanced. The muscles involved are the deep trunk muscles, transverse abdominus (TA), multifidus (MF), internal obliques (IO), external obliques (EO) paraspinal muscles, and pelvic floor muscles.

It is crucial to train these muscles because when these muscles are strong, they fire in a coordinated manner prior to any limb movement. When they are weak, they may not fire in time, may not fire in sync, and may not fire with enough strength to protect the spine. ¹

The first step is to master what is known as “core bracing.”

How to Brace Your Core:

- First to give you an idea of what the “movement” is like, let’s practice with your arm. Stiffen or brace your arm so it can’t be moved when someone shakes your hand. Feel how you can just “brace” your arm muscles. That’s exactly what you’ll do with your core.

- To practice bracing your core, sit tall on the edge of your chair with feet flat and your back away from edge of chair.

- Take a deep breath in then exhale while gently bracing or stiffening your abdominal area. Just like you braced your arm, so if someone pushed on your shoulder or back, you wouldn’t be able to be pushed around easily.

- Continue to breathe while you focus on gently bracing your core.

- **DON’T:** suck your stomach in, push it out, hold your breath, press your back into the chair back, or shrug your shoulders.

- **DO:** breathe regularly, gently brace your core and feel your RA, TA, IO, EO, spinal and pelvic floor muscles gently tighten.

- Practice this 20-30 times throughout your day – while standing, sitting, lying down, running, cycling, etc. Use triggers to remind you, such as phone ringing or stop lights/signs, etc.
Three KEY Core Exercises

The latest research on low back injury prevention by Stuart McGill, PhD\textsuperscript{2,3}, gives us the three key core exercises. These are foundation exercises, so be sure you can do these successfully before you do other core exercises.

The exercises below are designed to be done in stages. You can proceed from beginner to intermediate to advanced, once you can perform all the sets and reps of each level with the proper form. The exercises are designed to build endurance (by holding for 8 seconds), and strength (by performing the sets and reps listed.) These exercises may be performed on a daily basis.

1. Curl Up (For the Rectus Abdominus)
   - For the \textit{beginning stage}, lay on your back with your hands placed under the small of your back. (This position allows you to maintain a neutral spine by preventing the spine from flattening against the floor.)
   - Bend one leg to 90 degrees at the knee, leaving the other leg on the floor.
   - Raise the head and shoulders a few inches off the floor, hold for 8 seconds, and lower. Keep the head and neck rigid and no not let them curl upward.
   - Repeat for 2 sets of 15, then switch legs and repeat.
   - For the \textit{intermediate stage}, bend both knees to 90 degrees, and then lift your elbows off the floor by one inch. Keep the head and neck rigid and raise a few inches. Hold for 8 seconds.
   - The most \textit{advanced stage} would be to keep both knees bent, and then place your fingers on your forehead. Raise your head and shoulders up as in the original exercise, hold for 8 seconds.

2. Side Bridges (for the quadratus lumborum (QL), TA, and IO/EO)
   - For the \textit{beginning stage}, start on your right side, supported by your elbow and hip. Straighten out your body as you lift your hips off the floor.
   - Hold for 8 seconds and return to the floor. Do 2 sets of 15. Switch sides and repeat.
- For the **intermediate stage**, lift top leg off the ground from the starting position, hold for 8 seconds. Do 2 sets of 15. Switch sides and repeat.

- For the **advanced stage**, perform the original exercise for 8 seconds, roll to your elbows into plank position and hold for 8 seconds, then roll to your left side and hold for 8 seconds. Keep the body straight and do not let your side dip down. Do 2 sets of 15.

3. **Leg and Arm Extensions (for the back extensors)**

- For the **beginning stage**, start on the floor on your hands and knees. Raise your left arm straight to the front while maintaining your spine parallel to the floor. Hold for 8 seconds, and then lower. Repeat with your right arm. Extend your left leg straight back parallel to the floor. Hold for 8 seconds, and then lower. Repeat with your right leg.

- For the **intermediate stage**, lift your left arm and right leg at the same time. Hold for 8 seconds, and then lower. Switch legs and arms and repeat.

- For the **advanced stage**, perform the intermediate stage, but instead of returning to the resting position, “sweep” your arm and leg through the starting point and immediately repeat 5 times. Repeat on the other side.

- For each of these stages, do 2 sets of 15.

4. pponline.co.uk
Mobility and Stretching

Mobility refers to the ability to perform a joint action through a full range of motion. A proper selection of mobility exercises includes both general mobility exercises so an athlete can benefit from other forms of training and specific stretches so the athlete is best prepared for the joint actions of their specific event.

There are three general types of stretching: static, dynamic (ballistic), and assisted. In the static and ballistic stretches, you are in control of the movements. In the assisted stretches, a partner controls the movements. If you perform more than one type of stretch in a warm up or in a stretching session, perform them in the order listed.

**Static stretching:** gradually ease into the position and hold from 6 to 60 seconds. You may move further into the stretch as the muscles loosened up. It’s simple to carry out, may be performed anywhere, and provides the least amount of muscle soreness.

**Dynamic stretching:** this involves slowed, controlled movements, so start off moving at half speed for a few repetitions, and gradual move into full speed. Use these before an event that requires ballistic movements. Don’t perform these after such an event, as the muscles will be prone to injury.

**Assisted stretching:** choose a partner who fully understands their role, otherwise you may risk injury. They may assist you in partner stretches and proprioceptive neuromuscular facilitation (PNF) stretches. In partner stretches, they can ease you into the stretching position and assist you to maintain the correct position. You should remain relaxed and breathe normally through all stretches. Generally hold each of these stretches for 30 seconds.

In PNF stretches, you move into a position where you first feel a stretch. Your partner then holds your limb in that position while you push against your partner using about half of your strength (engaging the antagonist muscles) for 10 seconds. Your partner should provide resistance during this time. After 10 seconds, inhale, relax your limb, and let your partner push you into a further stretch. Repeat this process three or four times. PNF stretches are good for getting maximum flexibility gains in the shortest possible time.

Some mobility exercises and stretches are listed in the following sections:
Mobility Exercises

Shoulder circles
Stand or sit tall with proper posture. Elevate one shoulder (not arm) to your ear, move it backwards, down, and then up again in a smooth arc. Circle this shoulder 10 times, and then repeat on the other side.

Arm circles
Stand tall with proper posture. Lift one arm forward, and then swing it backwards in a circling motion. Keep your spine neutral, and circle the arm for 30 seconds. Repeat on the other side.

Side bends
Stand tall with proper posture, feet hip width apart, knees slightly bent, hands on hips. Lift your trunk up and away from your hips and bend smoothly to the left, then the right. Repeat 20 times, inhaling each time you return to the center.

Trunk twists
Same posture as in “side bends.” Turn smoothly and slowly to the right, then the left, breathing smoothly throughout the movement.

Half squat
Stand tall with proper posture, holding your hands out in front for balance. Bend at the knees until your thighs are parallel to the floor, keeping your back long, and looking straight ahead. Make sure your knees are tracking over your toes. At the lowest point, straighten your left and come up smoothly. Repeat 20 times, exhaling each time you straighten up.
Stretches

**Standing calf stretch**
Stand tall with one leg in front of the other, hands at shoulder level pressed into a wall in front of you. Scoot your back leg further away from the way, pressing your heel into the floor, and feel a stretch in the calf of the back leg. Hold 30 seconds, switch legs, and repeat.

**Standing lower calf stretch**
In the same position as the “standing calf stretch,” bend the knee of the rear leg so that you feel a stretch in the lower portion of the calf. Hold 30 seconds, switch legs, and repeat.

**Lying hamstring stretch**
Lie on your back with your knees bent to 90 degrees. Raise one leg, grabbing loosely behind the thigh with both hands (or use a strap to assist.) Keeping that leg straight, stretch it towards your chest. Hold for 30 seconds. Switch legs and repeat.

**Seated groin stretch**
Sitting tall, drop your knees away from each other so the soles of your feet touch. Rest your hands on your ankles, and slightly hinge forward from the hips. Press down on inner thighs to deepen stretch. Hold for 30 seconds.

**Kneeling hip flexor stretch**
Kneeling on a mat with left leg and bend your right leg in front of you with your foot on the floor, stretch your hips forward until you feel a stretch along the front of your kneeling thigh. You may need to scoot your rear knee back to feel the stretch. Hold for 30 seconds, switch legs and repeat.

**Seated trunk twist**
Sit tall with your legs outstretched. Place your right foot over your left leg (at the knee), and then rotate your trunk, using your left arm against your right knee to guide you into the stretch. Your right arm goes just behind your body on the floor for support. Hold for 30 seconds, and then switch sides and repeat.

**Upper back stretch**
Sit or stand. Interlace your fingers in front of you, turn your palms out, and push your hands as far as possible away from your chest. Allow your upper back to relax, and look down. You should feel the stretch between your shoulder blades. Hold for 30 seconds.
Foam Roll Exercises

The foam roll is a great tool to use for and early warning that muscles are getting tight. This method of self-massage is very effective in relieving the pain and tightness associated with tight trigger points and soft tissue injuries. It can increase circulation to the muscles, break up adhesions in the muscles and fascia, and reduce the intensity of tight trigger points. It can be used for just about any muscles that is injured or overused.

The basic method of use is to roll on an area until you find the most tender spots, and focus treatment on those areas for up to a minute per spot. Foam rolling can be done before an event, after an event, or as daily self care. Here are some of the common muscles that can be treated with a foam roll:

<table>
<thead>
<tr>
<th>CALVES (Gastroc/Soleus)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preparation:</strong></td>
</tr>
<tr>
<td>● Place foam roll under mid belly of lower leg.</td>
</tr>
<tr>
<td>● Cross left leg over right leg to increase pressure (optional).</td>
</tr>
<tr>
<td><strong>Movement:</strong></td>
</tr>
<tr>
<td>● Slowly roll calve area to find the most tender area.</td>
</tr>
<tr>
<td>● If a “tender point” is located, stop rolling, and rest on the tender point until pain decreases.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BACK OF THIGHS (Hamstrings)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preparation:</strong></td>
</tr>
<tr>
<td>● Place hamstrings on the roll with hips unsupported.</td>
</tr>
<tr>
<td><strong>Movement:</strong></td>
</tr>
<tr>
<td>● Feet are crossed to increase leverage.</td>
</tr>
<tr>
<td>● Roll from knee toward posterior hip.</td>
</tr>
<tr>
<td>● If a “tender point” is located, stop rolling, and rest on the tender point until pain decreases.</td>
</tr>
</tbody>
</table>
SIDE OF THIGH
(Ilio-Tibial Band)

Benefits:
- This can be a good form of muscle tension release for anyone who has flat feet.

Preparation:
- Position yourself on your side lying on foam roll.
- Bottom leg is raised slightly off floor.
- Maintain head in “neutral” with ears aligned with shoulders.
- If this is really uncomfortable only do it a little to start.

Movement:
- Roll just below hip joint down the lateral thigh to the knee.
- If a “tender point” is located, stop rolling, and rest on the tender point until pain decreases.

SIDE OF TORSO
(Latissimus)

Preparation:
- Position yourself on your side with arm outstretched and foam roll placed under arm area.
- Thumb is pointed up to pre-stretch the latissimus dorsi muscle.

Movement:
- Movement during this technique is minimal
- If a “tender point” is located, stop rolling, and rest on the tender point until pain decreases by 75%.
**SHINS**  
*(Tibialis Anterior/ Peroneals)*

**Benefits:**
- This can be a good form of muscle tension release for anyone who has flat feet.

**Preparation:**
- Position yourself on your side with elbow under the shoulder, opposing hand placed in front of the body and opposite leg bent forward to help stabilize.
- Position the roller on the side of shin.

**Movement:**
- Activate the core by drawing your lower abs in towards your spine.
- Raise the hips upwards increasing the pressure on the lower calf.
- If a “tender point” is located, stop rolling, and rest on the tender point until pain decreases.

**Note:** You can also do this by kneeling on the foam roll and rolling to the outside of the shins.

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**HIP/BUTT**  
*(Piriformis)*

**Preparation:**
- Begin positioned as shown with foot crossed to opposite knee.

**Movement:**
- Roll on the posterior hip area.
- Increase the stretch by pulling the knee toward the opposite shoulder.
- If a “tender point” is located, stop rolling, and rest on the tender point until pain decreases.
### FRONT OF THIGHS
*(Quadriceps)*

**Preparation:**
- Body is positioned prone with quadriceps on foam roll
- It is very important to maintain proper Core control (abdominal Draw-In position & tight gluteus) to prevent low back compensations

**Movement:**
- Roll from pelvic bone to knee, emphasizing the lateral thigh
- If a “tender point” is located, stop rolling, rest on tender point until pain decreases.

### INNER THIGH
*(Adductor)*

**Preparation:**
- Extend the thigh and place foam roll in the groin region with body prone on the floor.

**Movement:**
- Be cautious when rolling near the adductor complex origins at the pelvis.
- If a “tender point” is located, stop rolling, and rest on the tender point until pain decreases.

### MID-BACK
*(Rhomboids)*

**Preparation:**
- Cross arms to the opposite shoulder or behind your head to clear the shoulder blades across the thoracic wall.

**Movement:**
- While maintaining abdominal Draw-In position, raise hips until unsupported.
- Stabilize the head in “neutral”.
- Roll back and forth on mid-back area.
## SIDE OF HIP (Tensor Fascia Latae)

**Preparation:**
- Body is positioned prone with quadriceps on foam roll.
- It is very important to maintain proper Core control (abdominal Drawn-In position & tight gluteus) to prevent low back compensations.

**Movement:**
- Foam roll is placed just lateral to the anterior pelvic bone (ASIS).
- If a “tender point” is located, stop rolling, and rest on tender spot until pain decreases.

## TENNIS BALL on Hamstrings

- Sit on a hard chair with knees bent
- Put tennis ball under your thigh and find a tender spot
- Put weight down on it and straighten your leg (you can use a belt around your foot to help straighten your leg)
- Stay on the tender spot for 10-20 seconds with continuous pressure.
- Repeat on other tender spots on both hamstrings.
- Repeat 1-3 times daily.

## TENNIS BALL on bottom of feet

- Put tennis ball under the arch of foot.
- Put weight down on it and roll around in the soft area of foot until you find a tender area.
- Stay on the tender spot for 15-30 seconds with continuous pressure.
- Repeat on tender spots on both feet.
- Repeat 1-2 times daily.
Resources

Ask the Sports Doc:
drjess@innersport.com Ask injury or training related question you have

Active Release Techniques Certified Providers:
www.Innersport.com in East Bay
www.Transitionfitness.net in SF & Marin

Chiropractic:
www.Innersport.com in East Bay
www.avanzaresf.com in SF

Gyms:
www.nicirwinpersonaltraining.com in Berkeley
www.SynergyFitnessStudio.com in SF

Massage Therapy:
www.Innersport.com in Berkeley, Amy Howard and Betsy Abel
www.Transitionfitness.net in SF & Marin

Nutrition:
www.Triholisticnutrition.com Tamar Cohen

Online Resources:
www.innersport/blogs.com
www.batc.org
www.runblogger.com

Physical Therapy:
www.Innersport.com in Berkeley
www.juliewongpt.com Carrie Cameron in SF

Pilates:
www.centerstrength.com in Berkeley
www.SynergyFitnessStudio.com in SF
www.RealPeoplePilates.com in Corte Madera

Podiatry:
www.saintfrancismemorial.org – in SF, Dr. Blake
www.wellfeet.com – in Corte Madera, Dr. Ehrenberg

Running/Sports Analysis:
www.innersport.com – Dr. Jess
www.transitionfitness.net – Laura Bray

Shoe stores:
www.transportsrunswim.com in Berkeley and Oakland
www.fleetfeetsanfrancisco.com in SF
www.archrivalsports.com in Marin

Sports Medicine / Orthopedic Doctors:
http://www.saintfrancismemorial.org/Medical_Services/195338 Bill Ross, MD in WC and SF at Center for Sports Medicine
www.drkristinwingfield.com Dr. Kristin Wingfield in SF/Marin

Yoga:
www.yogaworks.com In Berkeley, Jonathan
www.burkmanyoga.com in SF
www.yogaworks.com in Marin