

# NATIONAL



# Physical Therapy

## Smart Running

### How can Physical Therapy help you become an educated runner?

Learn how to **prevent injuries**, **build strength**, and **improve flexibility** with a Physical Therapist, the movement expert.

Find out how to perform a sneaker analysis of outer soles and insoles for your feet, **optimize body mechanics**, and **The NAKED TRUTH BEHIND Bare Foot Running!**

**Free taping for Runners at 12, followed by stretching and refreshments after the race.**

**For more information and to request an appointment visit us at:**  
[\*\*www.NationalPhysicalTherapy.com\*\*](http://www.NationalPhysicalTherapy.com)



### Our Locations

169 North Franklin St.  
Holbrook, Ma  
(781) 767-5200

49 Pearl St.  
Brockton, Ma  
(508) 580-9995

387 Quarry Street  
Fall River, Ma  
(508) 324-9300

24/7 Family Fitness  
333 Tosca Dr.  
Stoughton, Ma  
(781) 767-5200 \*Salt Water Pool

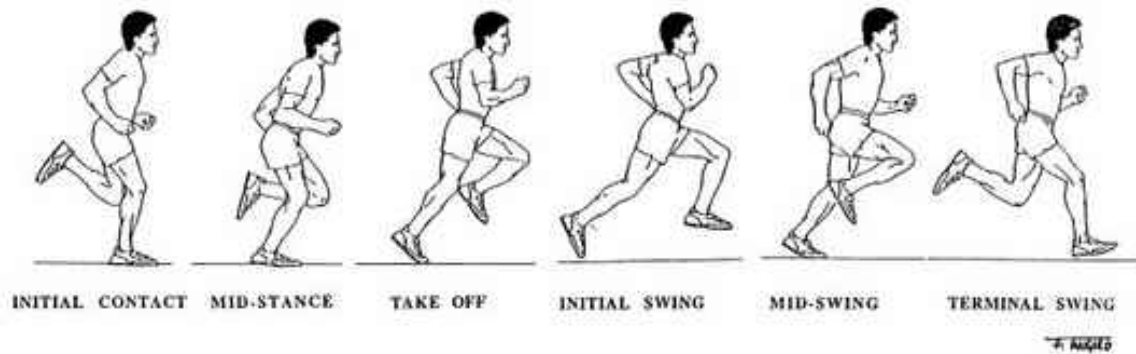
20 East St  
Hanover, Ma  
(781) 826-8309 \*Aquatic Therapy

**ABINGTON  
WINTER FUN  
RUN**  
SUNDAY, JAN. 18<sup>TH</sup>  
1:00 PM TO 2:00 PM

Where : ABINGTON  
POLICE STATION

**National Physical  
Therapy** presents  
"SMART RUNNING"

# The Running Cycle



## 1. Initial Contact to Foot Flat

- a. This is when your heel first contacts the ground. During this phase your body must absorb a force of up to 2.2 times your body weight!
  - i. In order to absorb the shock you must have proper joint motions (in the hips, knees, and ankles), and effective eccentric (muscle lengthening) muscle contractions.

## 2. Foot-Flat to Heel-off

- a. During this phase your body is transitioning forward over your fixed foot.
  - i. Eccentric contraction of your calf muscles work to control the motion of your foot, and they move your tibia forward. The knee is stabilized by a co-contraction of the quadriceps and hamstring muscles.
- b. Just before your heel rises off the ground, the pelvis must be able to rotate to allow this smooth transition.

## 3. Heel-off to Toe-off

- a. This is when the heel rises, and prepares to push off and propel the leg forward. The forceful toe off comes from the “Windless Mechanism” where the plantar fascia on the bottom of your foot tightens, forcing the foot to become rigid, and powerful. The hamstrings now extend the hip, and the quads help extend the knee, while the shin muscles hold your foot up so your toe does not drag!

## 4. Initial Swing

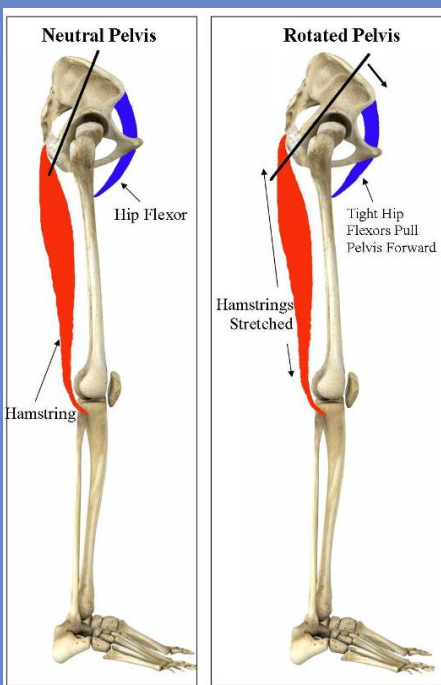
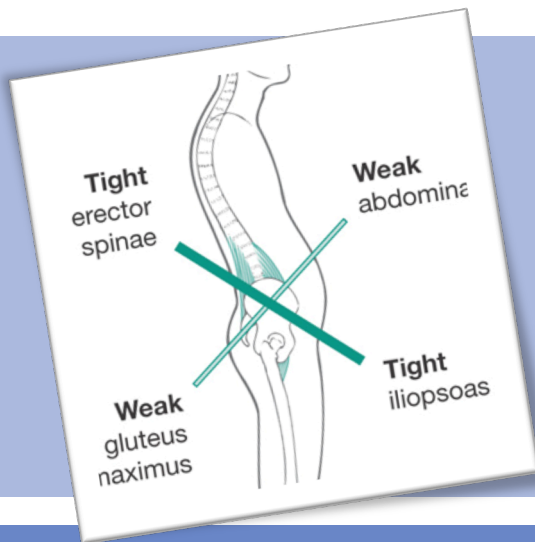
- a. Now your hip and knee must transition into a flexed position to swing your leg forward. This is done by eccentric quad and concentrically (muscle shortening) by the iliopsoas muscles. While the leg is swinging forward, the pelvis must abduct to stabilize the pelvis while the opposite limb hits the ground.

## 5. Terminal Swing

- a. Now the swinging leg must prepare to contact the ground again. In order to do so, the hip must move into extension through the concentric contraction of the hamstrings and glute muscle. Knee extension must also occur through eccentric contraction of the hamstrings, this slows down the rapid motion. The hip must adduct to allow the leg to move towards midline and allow for stabilization.

# Running Cycle

## Dysfunctions, Problems & Solutions!



### 1. Tightness of hip:

- Causes: Iliopsoas or hip flexor tightness, weak gluteus max muscles, tightness of the 2 joint quadriceps muscles, IT Band tightness
- Effects: decreased stride length (slower running times)
- Solution: Stretching of the tight hip flexors, and strengthening of the gluteus maximus muscles

### 2. Leaning Forward while Running:

- Causes: weak abdominal muscles, tightness of hip flexors, weak hamstring, and/or hamstring strain
- Effects: displaced center of gravity, forcing you to use more energy to remain balanced
- Solution: strengthen the abdominal muscles to maintain the pelvis in a posterior position to allow for less work!

### 3. Knee Pain:

- Causes: weak hip abductors, tightness of the IT Band
- Effects: patellofemoral pain syndrome, lateral knee pain
- Solution: strengthening the hip abductors, and stretching of the IT Band.

### 4. Shin Splints

- Causes: over pronation of the feet, rapid increase in intensity, running hills or uneven surfaces
- Effects: Pain in the front of shins while running, may result in stress fractures.
- Solution: learn how to properly increase exercise intensity, ice massage, stretching and strengthening!

### 5. Plantar Fascitis (Foot Pain)

- Causes: tight Achilles tendon, tight calf muscles, flat feet
- Effects: changes in steps, decreased weight bearing, pain
- Solution: stretching the calf muscles and the plantar fascia, proper shoes, rest.

# Achillies Tendonitis and Hamstring Strains

- **What is a Tendon?**

- Tough, flexible band that connects muscles to bones
- Tendons work with your muscles to help you move
- With constant repetitive movements, and overuse the tendons become inflamed and irritated causing **Tendonitis**

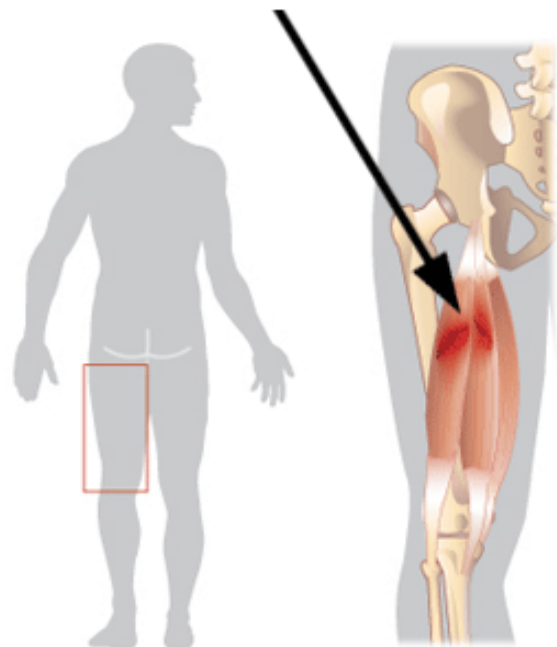


- **Achillies Tendonitis**

- The Achillies Tendon connects the 2 large calf muscle to the back of the heel bone
- Symptoms:
  - Pain in the back of the heel, that gets worse with activity
  - Stiffness in the heel in the morning
  - Painful to touch the back of heel or along the tendon
  - Swelling of tendon
- Causes:
  - Rapid increases in activities
  - Overtraining
  - Poor stretching habits of the gastroc and soleus
  - Excessive hill running or speed training
  - Excessive foot pronation, or inflexible shoes
- Solutions:
  - Rest
  - Cross training with swimming or biking to reduce the Achillies stress
  - Stretching Gastroc and Soleus
  - Proper shoes



## Hamstrings Muscle Tear



- **Hamstring Strain**

- A Strain is a minor tear of a muscle
- Quick acceleration while running or cutting is most often the cause
- You may feel a minor pulling or pop in the back of your thigh
- Pain, swelling, and an inability to run may result
- Treatment includes rest, ice, compression, elevation, and PT

# Intervention Strategies



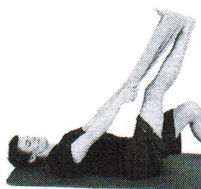
## Runner's Stretching

Created by mark karoul PT Jan 13th, 2015

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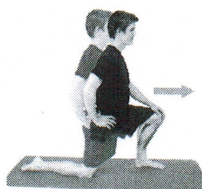
### HAMSTRING STRETCH WITH TOWEL

While lying down on your back, hook a towel or strap under your foot and draw up your leg until a stretch is felt under your leg, calf area.

Keep your knee in a straightened position during the stretch.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

5

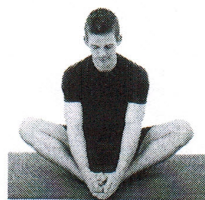


### HALF KNEEL HIP FLEXOR STRETCH

While kneeling, lean forward and bend your front knee until a stretch is felt along the front of the other hip.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

2



### BUTTERFLY STRETCH

While in a sitting position, bend your knees and place the bottom of your feet together.

Next, slowly let your knees lower towards the floor until a stretch is felt at your inner thighs.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

6



### PIRIFORMIS STRETCH

While lying on your back with both knee bent, cross your affected leg on the other knee.

Next, hold your unaffected thigh and pull it up towards your chest until a stretch is felt in the buttock.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

3

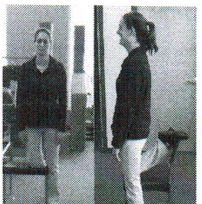


### V sit with lateral reach

Perform v sit stretch, lean to right leg and then left leg while keeping the knee straight. Hold each reach position for the appropriate period of time noted below

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

7



### Chair Stretch - Rectus Femoris and Hip Flexors

Stand next a chair and bend up one leg. Place the knee on the seat of the chair and the ankle/foot against the back of the chair. Perform a posterior pelvic tilt and gently forward until you feel a stretch in the front of the thigh.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

4



### Trunk Sidebend - ITB stretch

Stand with legs crossed

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

8



### PRAYER STRETCH

While in a crawl position, slowly lower your buttocks towards your feet until a stretch is felt along your back and or buttocks.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

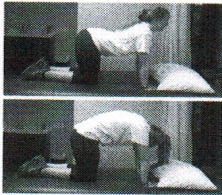
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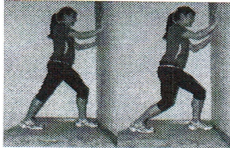
### Cat and camel

While on your hands and knees, arch your back up towards the ceiling and hold.

Then arch your back down towards the ground and hold.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

10



### Gastrocnemius/Soleus Stretch

Keep back leg straight and heel on floor, lean into wall until a stretch is felt in calf. Hold for 30 seconds.

Next, keep back leg slightly bent and heel flat on floor. Lean into wall until stretch is felt in calf. Hold for 30 seconds.

Repeat on other leg.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

11



### Standing Plantar Fascia Stretch

Stand with foot against the wall and the toes pointing straight up and slowly lower your foot to the ground maintaining toes pointing up.

Bring your hips towards the wall until you feel the stretch in the bottom of the foot.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

12



### Peroneal Stretch

Place towel under the inside of your foot. With your knee straight and your heel on the ground, lean forward into the wall.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day

13



### Posterior Tibialis Stretch

Place towel under the outside of your foot. With your knee straight and your heel on the ground, lean forward into the wall.

Repeat 3 Times  
Hold 30 Seconds  
Complete 1 Set  
Perform 1 Time(s) a Day



## HEP for strengthening - runner

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### STRAIGHT LEG RAISE - SLR

While lying or sitting, raise up your leg with a straight knee. Keep the opposite knee bent with the foot planted to the ground.

Repeat 10 Times  
Hold 1 Second  
Complete 3 Sets  
Perform 1 Time(s) a Day

2



### PRONE HIP EXTENSION

While lying face down with your knee straight, slowly raise up leg off the ground.

Repeat 10 Times  
Hold 3 Seconds  
Complete 3 Sets  
Perform 1 Time(s) a Day

3



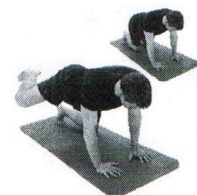
### HIP ABDUCTION SIDELYING 2

While lying on your side and upper most leg on pillows, slowly raise up the top leg to the side. Keep your knee straight and maintain your toes pointed forward the entire time.

The bottom leg can be bent to stabilize your body.

Repeat 10 Times  
Hold 3 Seconds  
Complete 3 Sets  
Perform 1 Time(s) a Day

4

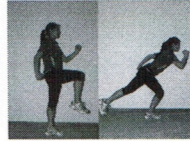


### FIRE HYDRANT - QUADRUPED HIP ABDUCTION

Start in a crawl position and raise your leg out to the side as shown. Maintain a straight upper and mid back.

Repeat 10 Times  
Hold 3 Seconds  
Complete 3 Sets  
Perform 1 Time(s) a Day

5



### Running Man

Standing on left leg, bring right leg to 90 degrees in front of you.

Next, extend right leg behind you until you reach a lunge position keeping weight on left leg.

Keep left leg in straight forward alignment.

Repeat sets on both legs.

Repeat 10 Times  
Hold 5 Seconds  
Complete 3 Sets  
Perform 1 Time(s) a Week

6



### Bridging with Alternating Leg Extension

Laying on your back with knees bent and feet flat, raise your buttock off the ground into a bridge position. Then alternate extending on leg at a time. Kicking out once on each leg is one repetition.

Repeat 10 Times  
Hold 3 Seconds  
Complete 3 Sets  
Perform 1 Time(s) a Day

7

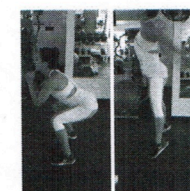


### Wall Sit

Back flat against wall, knees bent at 90 degree angle. Fire gluteus and hamstrings. To increase intensity use an elastic band around the knees and/or increase duration.

Repeat 3 Times  
Hold 30 Seconds  
Complete 3 Sets  
Perform 1 Time(s) a Day

8



### Jump Squats

Start down in that squatting position. Hips down and back, chest up, core tight, weight in your heels! Use your arms to get momentum and jump as high as you can. When coming down to a landing position make sure you land nice and soft with your knees bent back in that squatting position.

Repeat 10 Times  
Hold 0 Seconds  
Complete 3 Sets  
Perform 1 Time(s) a Day

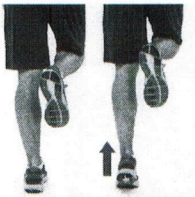
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### STANDING HEEL RAISES - SINGLE LEG

While standing on one leg, raise up on your toes as you lift your heel off the ground.

Repeat 10 Times  
Hold 1 Second  
Complete 3 Sets  
Perform 1 Time(s) a Day

10



### Heel Walks

This exercise involves walking on both feet. Legs should be straight and feet should be dorsiflexed so that all of the body weight is on the heels of the feet. Hold this position while walking around using baby steps.

Repeat 20 Times  
Hold 1 Second  
Complete 1 Set  
Perform 1 Time(s) a Day

# Choosing the shoe for YOU!

The first thing you need to do is determine what type of foot you have

- Look at a pair of your worn running shoes, where is it more worn down?
  - Equal Wear on both sides
    - Neutral Foot
  - Excessive wear on the inside of the sole
    - Flat Arch
  - Excessive wear on the outside of the arch
    - High Arch

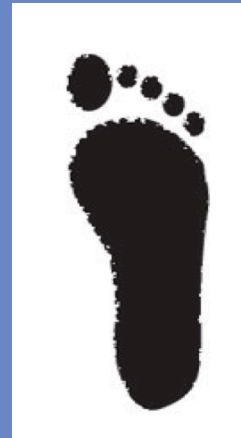
## Types of Running Shoes

- **Cushion Running Shoes**
  - Most flexible, and encourages natural pronation
  - Offers extra shock absorption but does not have stability or motion control features
- **Stability Running Shoes**
  - These have light support features on the medial side and well-cushioned midsoles
  - This help guide mild-to-moderate overpronation
- **Motion Control Running Shoes**
  - This category incorporates extra stability features on the medial side to help control severe overpronation.
  - Runners with very flat arches may need the extra support and stability of motion control shoes.



### Shoes for Normal Arches:

- Neutral Shoes
- You do not need motion control shoes!



### Shoes Flat Arch or Over Pronators

- Well cushioned midsoles
  - This helps guide the over pronation
- Motion Control shoes

### Shoes for High Arches or Under-Pronators

- Least Common Arch
- Foot doesn't absorb shock well
- Shoes need extra cushion
- Customizable insole may help to!
  - You must make sure that new insoles match the outer soles of your shoes!
- Avoid Motion control and stability shoes

# The Naked Truth Behind Barefoot Running

What you should know before making a decision!

## Facts

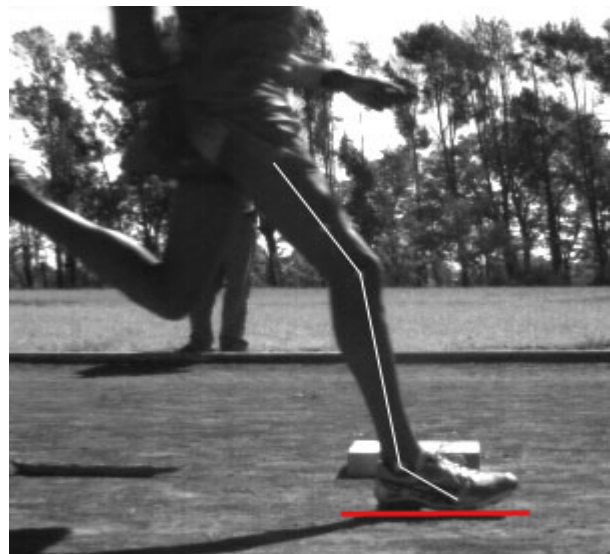
- There is minimal cushioning
- Designed to be worn without socks
- Some have individual Toes compartments for each toe, giving the toes freedom to flex
- Least amount of shock absorption
- They are designed for people with midstrike running style, not heel strike
- There is minimal arch support
- As you run faster you use a midfoot strike
- Long distance runners tend to use a rearfoot, or heel strike

## Cons of barefoot

- Little to no foot protection
  - Ice, glass, rocks, nails, thorns
- Without heel support, increased risk of developing calf strain or even Achilles Tendonitis
- Plantar Fascia Pain
  - Your feet are not used to the added stress and increase risk of plantar fasciitis
- Blisters
  - Again, your not use to the added stress!

If you decide to try them:

- Make the Transition Slowly
  - Run only 5-10 mins at first, at a slow pace, then slowly increase if tolerable
- Focus on your posture
  - Land on your forefoot or midfoot (the ball of your feet)
  - Avoid landing on your heels
  - Strides should be short
  - Stay upright and keep your feet under your hips and shoulder
  - Be light on your feet!



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this subject matter please visit  
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**Thank You!**