

# Shin Splints

**with Rick Kaselj, MS**

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## My Story

**Rick Kaselj**

- Exercises and injuries
- BSc – 1997
- MS – 2008 / RC
- Work – physio, studio, gym, rec centre, rehab centers
- Courses – live, webinars, video presentations
- Writing – books, manuals
- Blog – ExercisesForInjuries.com



**Rick Hiking 4300 km / 5 months from Mexico to Canada**

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## Objectives



- **Part 1** – What is Shin Splints?
- **Part 2** – Exercise Do's and Don't for Shin Splints
- **Part 3** – 3 Step (~12 Week) Exercise Program for Shin Splints

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**Part 1 – What is Shin Splints?**

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**What is Shin Splints?**

– “Medial tibial stress syndrome (MTSS) is an overuse injury or repetitive-stress injury of the shin area. Various stress reactions of the tibia and surrounding musculature occur when the body is unable to heal properly in response to repetitive muscle contractions and tibial strain.”

- Galbraith 2009

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**What is Shin Splints?**



- **Spectrum of Tibial Injuries**
  1. **Tendinopathy** – tendon injury
  2. **Periostitis** - inflammation of the periosteum (a layer of connective tissue that surrounds bone)
  3. **Periosteal Remodeling** – remodeling of the bone
  4. **Stress Fracture** – small crack in the bone

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### What Causes Shin Splints?



- Dysfunction of tibialis anterior
- Dysfunction of tibialis posterior
- Dysfunction of soleus
- Knee abnormalities (genus varus or valgus)
- Tibial torsion

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### What Causes Shin Splints?



- Foot arch abnormalities
- Leg-length discrepancy
- Hyperpronation of the subtalar joint
- Dysfunction of the spine, sacroiliac joint, and pelvis can contribute to injuries of the lower extremity

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### Key Factors that Lead to Shin Splints



- Training errors
- Changes in training
- Previous lower leg injury (shin splints, stress fracture) - (Hubbard 2009)
- Increase foot pronation – Moen 2009

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### Key Factors that Lead to Shin Splints



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- Decrease hip internal rotation – Moen 2012
- Navicular drop (especially in runners - Therapist assess this) – Moen 2012
- Increase ankle plantar flexion (foot to shin) – Moen 2012
- Use of orthotics - (Hubbard 2009)
- Physically active individuals
- Athletes

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### What are the Symptoms of Shin Splints?



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- Vague and diffuse pain the middle to lower shin area when exerting
- Sensitivity on the medial ridge of the tibia (origin of the tibialis posterior and soleus muscles)

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### What are the Symptoms of Shin Splints?



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- **Progressive Symptoms**
  - Subsides during training or when exertion is stopped
  - Pain occurs with less activity
  - Pain occurs at rest

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### What are the Symptoms of Shin Splints?



- Often times not a serious injury but very disabling and can progress to serious complication if not addressed properly
- Can progress onto a tibial stress fracture

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### Interesting Facts about Shin Splints



- In 1913 it was originally described as "spike soreness" (Herring 2006)
- Most common lower leg injury in sport (Craig 2008)
- 4% of healthy military recruits participating in basic training (Herring 2006)
- 6% to 16% of all running injuries (Craig 2008)

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### Interesting Facts about Shin Splints



- 50% of all lower leg injuries in select populations (Craig 2008)
- Most often found in runners but also in other ballistic sports like football, basketball, soccer and dancing
- Shin splints are more common in females – Moen 2009
- Females are 1.5 to 3.5 times increased risk for progression to stress fractures

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### Interesting Facts about Shin Splints



- Athletes that were in a sport less than 5 years are more likely to get shin splints (Hubbard 2009)
- Previous history of shin splints or a stress fractures increase your risk of getting shin splints (Hubbard 2009)
- The use of orthotics increases your risk of shin splints (Hubbard 2009)
- Reported as most or second most frequently diagnosed running injury (13.2% to 17.3%) - Raissi 2009

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### How Do You Know You Have Shin Splints?



- Physical tests
  - Physical exam
  - Palpation
  - Mechanism of injury
  - Location of pain
- Verify with:
  - Bone Scan
  - MRI – gold standard

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### What Else Could it Be?



- Exertional compartment syndrome
- Peripheral vascular disease
- Muscle tear
- Occult fracture
- Effort-induced venous thrombosis
- Peroneal nerve entrapment
- Popliteal artery entrapment syndrome

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**Other Names for Shin Splints**



- Shin Splints
- Shin Splint Syndrome
- Anterior and posterior medial shin splints
- Medial tibial stress syndrome
- Tibial stress reaction

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**Other Names for Shin Splints**



- Medial tibial syndrome
- Tibial stress syndrome
- Soleus syndrome
- Medial tibial stress syndrome (MTSS)
- Tibial stress injury

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**Other Names for Shin Splints**



- Tibial stress syndrome
- Tibial fasciitis
- Exercise-induced lower leg pain
- Exercise Related Leg Pain (ERLP)

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### Key Structures Involved in Shin Splints



- Overall Structure
  - Lower leg

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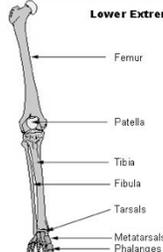
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### Key Structures Involved in Shin Splints



- Key Joint
  - None
    - Area
  - Subtalar joint
- Key Structure (Bone)
  - Tibia
    - Distal 2/3 of posterior-medial border of the tibia

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### Key Structures Involved in Shin Splints



- Pain site of Posterior Shin Splints
  - Distal 2/3 of the posterior-medial border of the tibia

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### Key Structures Involved in Shin Splints

– Pain site of Anterior Shin Splints

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### Key Structures Involved in Shin Splints

- Key Joint
  - Subtalar joint or Talocalcaneal joint
  - Side to side movements
  - Ankle joint is between the tibia, fibula and talus

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### Key Structures Involved in Shin Splints

- Key Joint Structures (bones)

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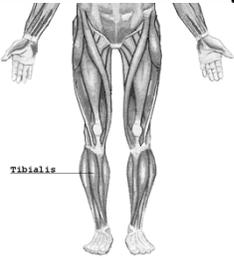
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**Key Structures Involved in Shin Splints**



**• Key Muscles**  
– **Tibialis anterior**  
• *Dorsiflexion (toe up) and inversion (foot in)*

Tibialis

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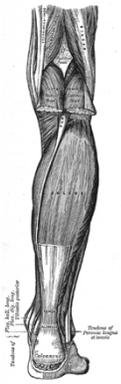
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**Key Structures Involved in Shin Splints**



**• Key Muscles**  
– **Soleus**  
• *Assists in plantar flexion (toe away)*

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**Key Structures Involved in Shin Splints**



**• Key Muscles**  
– **Tibialis Posterior**  
• *Stabilizes the ankle*  
• *Inversion (foot in)*  
• *Assists in plantar flexion (toe away)*

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**What Can You Do About It?**

- Rest
- Icing
- Ultrasound
- Whirlpool baths
- Electrical stimulation



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**What Can You Do About It?**

- Shock wave therapy
- Injections
- Acupuncture
- X-ray



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**What Can You Do About It?**

- Bone Scans
- MRI – gold standard
  - *“abnormal findings in asymptomatic subjects means that results should be interpreted with caution” – Moen 2009*



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### What Can You Do About It?



- **Surgery**
  - effective at decreasing pain
  - 41% of athletes returned to pre-symptom sports activity
    - (Yates 2003)

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### Remember! (IMPORTANT)

1. Get things check out
2. Get an accurate diagnosis
  - Any medical investigations
3. Get clearance to start an exercise program
4. Bring this exercise program to your doctor to see if it is right for you



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### Part 2 – Do's and Don't for Shin Splints

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**Do's and Don't for Shin Splints**

- **Flexibility and Self Massage**
  - Addressing Decrease in Internal Rotation of the Hip (Moen 2010)
  - Improve range of motion
  - Recovery
  - Pain relief



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**Do's and Don't for Shin Splints**

- **Core Strength**
  - Core exercise and balance training
  - Dysfunction of the spine, sacroiliac joint, and pelvis can contribute to injuries of the lower extremity



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**Do's and Don't for Shin Splints**

- **Foot Pronation**
  - Work on ankle strength
  - Pronation-control insoles
  - Neoprene or semi-rigid orthotics may help prevent MTSS but (Moen 2009) also increase the risk of it (Hubbard 2009)



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**Do's and Don't for Shin Splints**

- **Improve Endurance**
  - Improve plantar flexor muscle (toe up) endurance
    - (Madeley 2007)



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**Do's and Don't for Shin Splints**

- **Activity**
  - Weekly activity
  - Exercise routine
  - Running mileage, intensity, pace, terrain, footwear



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**Do's and Don't for Shin Splints**

- **Training Errors**
  - Any changes to training
  - Training Errors – increased activity, intensity, duration, running on hard surfaces, running on uneven surfaces,
  - One study found that 60% of participants that had shin splints had it because of training errors

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**Do's and Don't for Shin Splints**

- **Encourage to:**
  - Decrease decrease distance, frequency and intensity by 50%
  - Avoid running hills, uneven surfaces, very firm surfaces
  - Run on uniform surfaces or synthetic track

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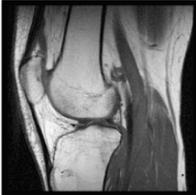
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**Do's and Don't for Shin Splints**

- **Footwear**
  - Provides sufficient shock absorbing
  - At the 250 to 500 mile mark of a shoe, 40% of the shock absorbing effect of the shoe is lost
  - Sock absorbent insoles



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**Do's and Don't for Shin Splints**

- **Managing Weight**
  - Higher body mass index lead to a longer recovery
    - (Moen 2012)



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### Do's and Don't for Shin Splints



- **Education**
  - What is Shin Splints?
  - What makes it worse?
  - What to do about it?
  - How to do your exercise program properly?

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### Part 3 – 3 Stage (~12 Week) Exercise Program for Shin Splints

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### 3 Stage (~12 Week) Exercise Program for Shin Splints

	Stage 1	Stage 2	Stage 3
#1 – Flexibility & Release	Calf Str / Standing Soleus Str / Shin Str / On Stomach In Out Heel / Shin Foam Rolling	Calf Str / Standing Soleus Str / Shin Str / On Stomach In Out Heel / Shin Foam Rolling	Calf Str / Standing Soleus Str / Shin Str / On Stomach In Out Heel / Shin Foam Rolling
#2 – Core Strength	Bridging with Hips Low	Bridging with Hips Low and One Foot Off Ground	Bridging with Hips High and One Leg Straight
#3 – Ankle Strength	Toe In / Out / Up / Away - Isometrics	Toe In / Out / Up – Against Tubing	Nothing
#4 – Balance Training	Single Leg Balance	Single Leg Standing on Rocker Board – Forward & Backwards	Single Leg Standing on Wobble Board
#5 – Tibialis Anterior Strengthening	Seated Toe Ups	Standing Toe Ups	Toe Up Pulse
#6 - Plyometrics	Seated Ankle Hops / Single Leg Depth Drop / Single Leg Slant Depth Drop	Standing Bilateral Ankle Hops in Pool or on Trampoline / Depth Jump in Pool / Alternating Leg Bounding in Pool	Standing Bilateral Ankle Hops / Depth Jump / Box Jump / Alternating Leg Bounding

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## Exercises for Shin Splints



- **Equipment**
  - Foam Roller
  - Resistive tubing
  - Rocker Board
  - Balance Board
  - Riser
    - *Step in a house*
  - Bodyweight

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## Exercises for Shin Splints

### Focus on Plyometric Training

- Plyometrics is a form of training where you are coordinating intense plyometric (eccentric) muscle contraction or preload followed immediately by an intense and rapid miometric (concentric) muscle contraction.
- Tibialis posterior and tibialis anterior must efficiently store and release elastic energy that occurs during the stretch and shortening of muscle contraction during running.

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## Exercises for Shin Splints

### Focus on Plyometric Training cont.

- If tibialis posterior or tibialis anterior can not handle the storage and release of elastic energy, the extra force is transferred to the musculotendinous and musculofascial tissue zone leading to an overuse injury like shin splints.
- A progressing plyometric exercise program can be used to rehabilitate shin splints.

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### Exercises for Shin Splints

**Focus on Plyometric Training cont.**

- 6 to 8 week pre-plyometric program is encouraged
  - These are the stage 1 exercises and stage 2 exercises in the pool.
- One can progress to the plyometric exercises once a repeated single-leg hop test can be performed pain-free.
- Plyometric training period can be 10 to 16 weeks.

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### Exercises for Shin Splints

**#1 – Flexibility & Release**

- Calf Stretch
- Standing Soleus Stretch
- Shin Stretch

- 1 set of 2 repetitions, each held for 30 seconds, daily



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### Exercises for Shin Splints

**#1 – Flexibility & Release cont.**

- On Stomach Dropping Heels In and Out

- 1 set of 5 repetitions performed daily



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**Exercises for Shin Splints**

**#1 – Flexibility & Release cont.**

- Shin Foam Rolling
  - 1 set of 5 repetitions performed daily



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**Exercises for Shin Splints**

- **#2 – Core Stability**
  - Bridging with Hips Low
  - Bridging with Hips Low and One Foot Off Ground
  - Bridging with Hips High and One Leg Straight
    - 1 set of 5 repetitions on each side, with each held for 5 seconds, performed daily



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**Exercises for Shin Splints**

- **#3 – Ankle Strength**
  - Toe In Isometrics
  - Toe Out Isometrics
  - Toe Up Isometrics
  - Toe Away Isometrics
    - 6 repetitions, each held for 6 seconds at a 10% effort level, done daily



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### Exercises for Shin Splints

- **#3 – Ankle Strength**  
**cont.**
  - Ankle Toe Up Against Tubing
  - Toe Out Against Tubing
  - Toe In Against Tubing with Foot on Tubing
    - 2 sets of 10 repetitions done on each side with a minute rest between sets, done daily

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### Exercises for Shin Splints

- **#4 – Balance Training**
  - Single Leg Balance
  - Single Leg Standing on Rocker Board – Forward & Back
  - Single Leg Standing on Wobble Board
    - Perform 3 sets of 30 seconds, daily

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### Exercises for Shin Splints

- **#5 – Tibialis Anterior Strengthening**
  - Seated Toe Ups
  - Standing Toe Ups
    - 1 set of 5 repetitions performed daily

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**Exercises for Shin Splints**

- **#5 – Tibialis Anterior Strengthening cont.**
  - *Toe Up Pulse*
    - *Perform 1 set of 5 repetitions with a 5 second hold at the top and 5 pulse after the hold, done daily*



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**Exercises for Shin Splints**

- **#6 – Plyometrics**
  - *Seated Ankle Hops*
    - *Perform 2 sets for 2 minutes with a minute rest between sets, performed daily.*



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**Exercises for Shin Splints**

- **#6 – Plyometrics cont.**
  - *Single Leg Depth Drop*
  - *Single Leg Slant Depth Drop*
    - *2 set of 10 repetitions on each side, with a minute rest between sets, performed daily*



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### Exercises for Shin Splints

- **#6 – Plyometrics**  
**cont.**
  - Standing Bilateral Ankle Hops
  - Standing Single Leg Ankle Hops
    - Perform 2 sets of 10 repetitions with a minute rest between sets, performed every other day.



  
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### Exercises for Shin Splints

- **#6 – Plyometrics**  
**cont.**
  - Depth Jump
  - Box Jump
  - Alternating Leg Bounding
    - Perform 1 sets of 10 repetitions with a minute rest between sets, performed every other day.



  
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### Other Exercises that Would Be of Benefit

- **Core Exercises**
- **Check out**
  - ExercisesForInjuries.com



  
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**Objectives**



- **Part 1** – What is Shin Splints?
- **Part 2** – Exercise Do's and Don't for Shin Splints
- **Part 3** – 3 Step (~12 Week) Exercise Program for Shin Splints

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**More Details**

- **Check in the Reference Section of the Exercise Manual**



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**More FREE Information on Exercise & Injuries**

- **\$299 Fitness Education**
  - Returning the Shoulder Back to Optimal Function Seminar
  - Exercise Modification for the Sensitive Shoulder Seminar
  - Visit [www.ExercisesForInjuries.com](http://www.ExercisesForInjuries.com)

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**Thank You**

- Send me your questions!
- Visit [ExercisesForInjuries.com](http://ExercisesForInjuries.com) to get Your Shoulder Injury Guide and other great information on injuries and exercise
- Rick Kaselj
  - [support@ExercisesForInjuries.com](mailto:support@ExercisesForInjuries.com)
  - [www.ExercisesForInjuries.com](http://www.ExercisesForInjuries.com)

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**End**

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