Pilates and Plantar Fascial Rupture

By: Taylor Simpson

Greenwood Village, CO (February 2018)

Date: April, 2019

Abstract

This paper will address the use of Pilates for a ruptured plantar fascia. Plantar Fasciitis is one of the most common soft tissue injuries of the foot. About one in ten people will struggle with plantar fasciitis at some point during their lifetime. [1] The pain associated from this injury can be excruciating and inhibit your day-to-day activities. Plantar Fasciitis is the beginning stages of a plantar fascial rupture. This case study looks at my journey, a 25-year-old professional volleyball player with chronic plantar fasciitis that developed into a ruptured plantar fascia. Through 2 years of Pilates, I was able to deter new injuries in the foot and stabilize the muscles around the ruptured ligament to help my foot and entire body stay healthy. I have added two Pilates apparatus classes, and one mat class a week into my training regimen, and with this I have been able to stay on the court.

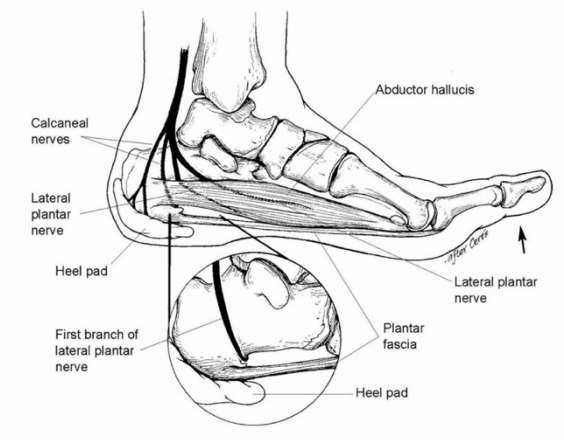
[1] Heel That Pain. "27 Fun Facts and Statistics about Plantar Fasciitis." *Heel That Pain*. September 2016.

Table of Contents

Anatomical Description and Plantar Fascia Rupture Indications

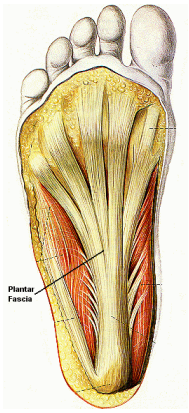
The Plantar Fascia is thickened fibrous aponeurosis that originates from the medial tubercle of the calcaneus and runs forward to form the longitudinal foot arch. From the heel, it divides into 5 bands of tissue down each of the five distal phalanges.

The function of the plantar fascia is to provide static support of the longitudinal arch and dynamic shock absorption.[2] Without this shock absorber in action, the plantar fascia begins to get overstretched and micro-tears can begin to occur on the surface, which then causes pain that is felt in the heel and sole of the foot. This can be caused from overuse, prolonged standing, intense workouts, tight calves or obesity. When fascia cannot bear the weight anymore, it will completely tear, leaving you with a few options to get back to health; surgery, corticosteroid injections, or alternative medicine, such as Pilates to strengthen the foot.



[1] Young, Craig. Rutherford, Darin. Neidfeldt. "Treatment of Plantar Fasciitis." *American Family Physician*. 2001. Volume 63, Number 3. 467.
[2] Journal of American Academy of Orthopedic Surgeons. "Plantar Fasciitis : Diagnosis and Conservative Management." 1997. 5(2) 109-117.

The thick white band of tissue extends toward the toes and divides into 5 separate bands that extend to the proximal phalanges (bones of the toes, closest to the foot). The superficial layer of plantar fascia embeds into the skin fold between sole and the toes. The deeper layer extends to embrace the digital flexor tendons on each proximal phalanx. The plantar fascia can be divided into three distinct parts: the medial part, the central part, and the lateral part. The thickest part is in the middle of the foot, and the thinner parts near the toes and the heel.[4]



The arch of the foot and the plantar fascia form what can best be described as a bow, as in a "bow and arrow". The arch forms the limbs of the bow and the plantar fascia form the string. Put another way, the plantar fascia is a sheet of connective tissue which stretches from the heel to the toes underneath the arch (bow) of the foot. When you step, you put weight on the arch; without it the arch would just collapse under the weight of your body.[5] Leading up to the rupture, one will normally have many weeks of heel pain. The plantar fascia tear can develop over time or happen suddenly. The signs and symptoms will be that of plantar fasciitis, but with more physical activity these will only worsen. The heel pain ends in a sudden pop, in which the

[3] "Plantar Fascia Anatomy."*Doc pods.* Docpods Pty Ltd, Web. Copyright 2016. *http://www.docpods.com/plantar-fascia-anatomy*
[4] "Plantar Fasciitis: A Connective Tissue Issue." Mueller-Kaul, Lu. *Balance Orlando*. Copyright 2016. https://www.balanceorlando.com/plantar-fasciitis-connective-tissue-issue/

plantar fascia tears completely through. The bruising and swelling will come with the inability to push- off the foot or bear weight without immense amounts of pain. Plantar fascia ruptures often occur in athletes who run, jump, and cut as part of the activity in their sport.[6] Once the fascia is ruptured, there is very little that can be done until scar tissue builds up to bridge the gap.

Case Study: Taylor Simpson (Myself)

Age: 25

Limitations: I was diagnosed with a ruptured plantar fascia after my first professional volleyball season in South Korea. I needed to rebuild strength in the foot, ankles, and calves to deter any new lower body problems occurring from this condition and to maintain my status as a professional volleyball player.

Rehabilitation Treatments: I tried Corticosteroid Injections, a Cast, Platelet-Rich Plasma (PRP), ARP Therapy (Accelerated Recovery Performance), Orthotics, and Physical Therapy.

I dealt with plantar fasciitis during 6 months of intense training (practicing 3 times daily, and jumping around 100 times a day) in South Korea before I felt the pop of the fascia. I am extremely active and have been for my whole life. I have played professional volleyball for the last four years, and this injury occurred after my first professional season. At the beginning, the pain would inhibit me from walking around a lot, or being on my feet because the pain would linger. I tried everything possible in the books, as far a rehabilitation goes. I needed to be on the court for work, so I did steroid injections, which I believe made it worse. Then after the injury occurred I started my rehab journey by being in a cast for 6 weeks and did a round of PRP injections. I hoped that the spinning of the blood cells would help create healing in the foot

[5] " Plantar Fascia Rupture." Williams, Bruce. *Boston Sports Medicine and Performance Group.* . Copyright 2013. http://www.bsmpg.com/Blog/bid/9

while it was not in use. After that, I started rehab with a traditional physical therapist in which I did not see any results. It was all very temporary relief, but the pain always came back. Then, I moved on to ARP therapy. This form of therapy is a proprietary electronic device combined with an active range-of-motion and other exercises to significantly speed up the body's natural recuperative ability. This helped significantly to get me out of pain. I added orthotics that I used in every pair of shoes I wore. This helped with creating a baseline of what my arch would mold into post injury, while the fascia was developing scar tissue to bridge the gap. Finally, I started Pilates which ultimately built the strength in my ankles, feet, calves, knees, and hips. This strength helped keep the foot strong and stable, even with the injury that I was told I would never heal. This Pilates regimen was one that I regularly used to keep my arches in my feet strong, despite not having a connected plantar fascia in my right foot.

Conditioning Program

BASI BLOCK	APPARATUS	EXERCISE(S)	NOTES
Warm-up	Mat/Cadillac	Pelvic curl, Spine twist supine, Chest Lift, Chest lift with rotation *7 reps each*	Feet should be pressing into the mat evenly, feet not rolling out or in, knees not falling in, legs squeezed together for spine twist supine
Footwork	Reformer: All Footwork *2 red, 2 green*	Parallel heels, Parallel toes, V-Position toes, Open-V position heels, Open V-position toes, Calf Raises, Prances Prehensile (with	The foot alignment needs to be carefully watched, as these are exercises where outward rolling foot positions may form, use full range of motion on the calf raises, prances and

		caution), Single leg heels, Single leg toes *10 reps each*	prehensile, make sure hip, foot and knee alignment are correct on single leg exercises
Abdominal Work	Reformer *1 red & 1 blue*	Hundred Prep, Hundred, Coordination	Working on pelvic-lumbar stabilization, maintain consistent height of trunk flexion throughout the exercise, knee in-out motion strong and with intention
Hip Work	Reformer *1 red & 1 blue*	Frog, Circles (Down, Up), Openings *10 reps each*	Hips above knees, Keep Pelvis stable on mat and not rocking, use the hip adductors to press legs together, maintain constant dorsi-flexion of foot in frog, plantar flexion in circles and openings, feet always in small V-position, lengthen through the weak side
Spinal Articulation	Reformer *1 red & 1 blue*	Short Spine, Long Spine *5 reps each*	Starting in dorsi-flexion and ending in plantar flexion (feet externally rotated), keep tension in straps when up on shoulders, maintain legs close to face, for long spine-keep feet above hips and in line, focus on foot positions to build strength

Stretching	Reformer *1 red*	Kneeling Lunge *7 reps each*	Hips level, knees and ankles in alignment with hip, flex foot on

			the floor during the hamstring stretch, extend spine to flat position
Full Body Integration	Reformer *1 red & 1 blue*	Elephant, Up Stretch 1, Up Stretch 2 *10 reps each*	Weight over the hips, feet flat for elephant, feet plantar flexed for up stretch, emphasize the "in" portion of the movement, stabilize trunk and shoulders
Arm Work	Cadillac *Arm springs off back*	Arms Standing Series Chest Expansion, Hug-a-Tree, Circles (Up & Down), Punches, Biceps, Butterfly *10 reps each, 5 for butterfly*	Maintain drawn back scapulae position for expansion, Lean forward slightly for rest of exercises, engage core and stabilize trunk, for butterfly keep hips and feet reaching towards the wall in front of you, palms face out
Leg Work	Wunda Chair *0:2* *0:4*	Leg Press Standing, Hamstring Curl *10 reps each*	Plantar Flexion on pedal, keep weigh back, more abs than leg, Ham curl-Halfway down, Watch for good alignment of the foot, ankle and hip, maintain neutral pelvis
Lateral flexion & rotation	Wunda Chair *2:2*	Side Pike *5 reps each side*	Trunk flexed with rotation, shoulders stacked over wrists, lean over the chair as lifting
Back Extension	Wunda Chair *0:3*	Swan Basic *7 reps*	Stabilize Trunk, press lower abs down into the mat, feet and legs glued together, plantar flexion

Results

This Pilates regimen was one that I used regularly for about eight months during my recovery period for my ruptured plantar fascia. I felt that I gained significant strength in my foot and ankle region allowing me to continue to play the sport I love, and play at a high level. Each block of this system I chose to strategically work on the weak parts of my body that needed strengthening and to help my foot adapt to new conditions. The strength I developed in my feet and entire body were way better than I expected. This training got me out of pain, and allowed me to continue with normal daily activity until I strengthened enough to be able to get back on the court. My flexibility increased, as well as my stability in my core, trunk, spine, pelvis, calves, and feet. Combined with volleyball practice and weight lifting, I felt that I was in the best possible shape I could be for this stage of my life.

Conclusion

Pilates is an amazing work out in general, but even better for rehabilitation of injuries. It has become a tool for physical therapists, professional athletes, and non-athletes to incorporate into their daily workout routine to create balance, stability, flexibility, and to decrease pain. With a strong Pilates conditioning program, someone with a ruptured plantar fascia can get back into sport, develop strength and stability in the foot region. I would definitely recommend using Pilates for those that deal with the battle of plantar fasciitis, but also for those with more intensive injuries such as a ruptured plantar fascia to relieve pain and to get back to your normal life!

BIBLIOGRAPHY

1. Young, Craig. Rutherford, Darin. Neidfeldt. "Treatment of Plantar Fasciitis." *American Family Physician.* 2001. Volume 63, Number 3. 467. Retrieved From: https://www.aafp.org/afp/2001/0201/p467.pdf
2. Journal of American Academy of Orthopedic Surgeons. "Plantar Fasciitis : Diagnosis and Conservative Management." 1997. 5(2) 109-117. Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/10797213
3. "Plantar Fascia Anatomy."*Doc pods.* Docpods Pty Ltd, Web. Copyright 2016. Retrieved From: *http://www.docpods.com/plantar-fascia-anatomy*
4. "Plantar Fasciitis: A Connective Tissue Issue." Mueller-Kaul, Lu. *Balance Orlando*. Copyright 2016. https://www.balanceorlando.com/plantar-fasciitis-connective-tissue-issue/
5. " Plantar Fascia Rupture." Williams, Bruce. *Boston Sports Medicine and Performance Group. .* Copyright 2013. http://www.bsmpg.com/Blog/bid/9