Designing a BASI Pilates Program for a Volleyball Athlete with Patellar Tendonitis

Eileen Mabel Vander Leun
January 8, 2014
2013 South Pasadena, BASI CTTC
ABSTRACT

The knee is one of the most important joints of our body. It plays an essential role in movement, related to, but not limited to jumping. As a former basketball athlete and current volleyball player, my client Andrea Wilkinson has developed Patellar Tendonitis – a common knee injury resulting from inflammation of the patellar tendon from overuse.

This paper discusses the structure of the knee joint, and more specifically the patellar tendon. It also discusses the pathology of Patellar Tendonitis – a common injury that occurs when you place repeated stress on your patellar tendon. It then explores the use of the BASI Pilates block system, to create a program for an athlete with patellar tendonitis, with the goal of contributing towards improved performance on and off the court without worsening the condition.
TABLE OF CONTENTS

2- Abstract
4- Anatomy of the Knee & Patella
6- Patellar Tendonitis
8- Case study
   a. About the Client
   b. Exercise Plan& Considerations
   c. The Program
12- Conclusion
13- Bibliography
ANATOMY OF THE WHOLE KNEE & THE PATELLA

THE KNEE

The knee is a complex joint that moves straight backward as well as twists slightly from side to side.

The knee is the meeting point of the femur in the upper leg and the tibia in the lower leg. The fibula, the other bone in the lower leg, is connected to the joint but is not directly affected by the hinge joint action. Another bone, the patella or kneecap, is at the center of the knee.

Two concave pads of cartilage called menisci disperse the friction created at the meeting of the ends of the tibia and femur.

There are also several key ligaments that connect these bones. The four key ligaments of the knee are:

- Anterior cruciate ligament (ACL)
- Medial collateral ligament (MCL)
- Lateral collateral ligament (LCL)
- Posterior cruciate ligament (PCL)
THE PATELLAR TENDON

The patellar tendon is the structure that connects the patella (knee cap) to the tibia (shin bone). Taking a closer look at anatomy, the knee-cap is a small floating bone (sesamoid) which attaches the quadriceps to the tibia through the patellar tendon. Hence the patellar tendon being a continuation of the bulky quadriceps muscle is pivotal in the way you move your leg. It helps the quadriceps muscle extend the lower leg so that you can kick a ball, jump in air or push the pedals on your bike.
PATELLAR TENDONITIS

Patellar tendinitis, also commonly known as ‘Runner’s Knee’ is an injury that affects the tendon connecting the (patella) to the shinbone. The patellar tendon helps your muscles extend your knee so that you can perform activities including, but not limited to kicking a ball, running uphill and jumping up in the air.

Patellar tendinitis is a common overuse injury. It occurs when you place repeated stress on your patellar tendon. The stress results in tiny tears in the tendon, which your body attempts to repair. But as the tears in the tendon become more numerous, they cause pain from inflammation and a weakening of the tendon structure.
CASE STUDY

About the Client

Andrea Wilkinson is a 26 year-old female athlete with Patellar tendonitis. She played basketball for 12 years, during which time she tore her A.C.L. Through the use of a patellar graft, doctors tried to repair the A.C.L injury. Nevertheless, with time, the injury evolved into Patellar Tendonitis. Andrea transitioned into competitive (beach) volleyball two years ago. She is an exceptional athlete and has excelled, but her knee condition (Patellar Tendonitis) has held her back from achieving to the fullest, the goals she has set out for herself. Andrea wishes not only to improve her athletic ability as a whole, but she specifically wants to achieve more flexibility and strength in her lumbar spine, strengthen her quadriceps muscles for continued squatting, and wants to learn to land safely on her (injured) knee when she jumps.

Exercise Plan & Consideration

Because Andrea’s goals include achieving more flexibility and strength in the lumbar spine, strengthening her quadriceps muscles, as well as landing safely from necessary jumps on the volleyball court, I designed a holistic exercise program, which addresses all of them. My goal in designing this program was to condition my client, so that she can improve her performance as an athlete by working the body holistically, and at the same time, improve the specific injury by stretching and strengthening the muscles
around the knee.

We have agreed that as a Pilates practitioner, I’m not qualified to “fix” her injury. However, I can stretch and strengthen her in the correct areas that will encourage proper use and recruitment of the muscles that she needs to play and continue to grow as an athlete.

Because some of the risk factors for patellar tendonitis are low ankle dorsiflexion, weak gluteal muscles, and muscle tightness in the calves, quadriceps muscle, and hamstrings, I will thoughtfully target those areas when creating my program for Andrea. In addition, strengthening exercises will be of the utmost importance. Since weak thigh muscles contribute to the strain on your patellar tendon, I will focus on eccentric exercises, which are meant to be particularly helpful.
**Program**

- **Warm-up** – Roll down at the beginning of each session so that I can check in for any postural deviations and so Andrea can check in with her body. As a warm up exercise, use Saw on the Mat to stretch the hamstrings. Then move into Pelvic Curl to focus on abdominals and more importantly, keep focusing on the hamstrings. Gluteal side lying series with leg weights for weak gluteal muscles, which are a risk factor for patellar tendonitis.

- **Foot Work Series on the Wunda Chair**- Given that some of the risk factors for patellar tendonitis are low ankle dorsiflexion, and muscle tightness in the calves, we will work through the entire foot work series on the Cadillac – paying particular attention to the calf raises and prances. The Chair can be more advantageous than the reformer for footwork to my client in that the client has a better vantage point to see what the feet are doing.

- **Abdominal Work** – Short Box Series on the reformer, paying special attention to the Flat Back exercise to focus on the back extensors. **From here, for the sake of flow, we’ll go right onto the sitting series on the box (on the reformer) using the Magic Circle. These all focus on the Hip adductors, which will help combat my client’s weak thigh muscles.**

- **Hip Work** – We’ll spend a fair amount of time on the hip work on the reformer as it will pay special attention to strengthening and stretching the Hip adductors which is a big goal of ours. We’ll work on Frog, Circles up & down, Openings,
Extended frog, and Extended Frog Reverse.

- Spinal Articulation – Bottom lift & bottom lift with extension will be big ones for us, as it not only encourage the articulation of the spine and strength of the abdominals, but it also focuses on hamstrings which is one of our target areas. As we progress, we will incorporate Short Spine, as it allows for a great Hamstring stretch. We’ll also add Semi-Circle as a great abdominal & Hamstring exercise with a lovely lumbar spine release.

- Stretches – Side Split to stretch the hip adductors we worked earlier with the sitting series on the box. Down stretch for back extensor muscle work. Then moving over to the Ladder Barrel Hamstring Stretch and Gluteals Stretch since those areas have been worked already. Shoulder stretch on the Cadillac to for mobility and flexibility in the shoulder rotators, for all the serving and hitting the ball Andrea does on the court.

- Full Body Integration – Staying on the Cadillac, Thigh Stretch with Roll up Bar to strengthen those quads for prolonged squatting during games, then Sitting Back for more stretching of the shoulder and for abdominals.

- Arm Work – Entire arm series on the Cadillac, and then for the sake of flow and because they are appropriate, we’ll including going into Squats for the type of leg work Andrea requires, as well as Butterfly for lateral flexion by focusing on the abdominal oblique muscles.

- Leg Work – Entire Jumping Series on reformer. This will allow Andrea to focus on Quadriceps, foot plantar flexors, Hip adductors, and also get used to the sensation of landing softly and safely without the usual pressure on her knee. Eventually, I
will incorporate a small ball, which Andrea will throw up in the air above her and catch as she does the jumping series for mind-body coordination that she will need on the court.

- Lateral Flexion – Butterfly as already discussed in arm work series on Cadillac
- Back Extension – staying on the reformer, Andrea will do the Long box Series (Pulling Straps 1 and 2). Not only is this series good for her back extensor strength, but also aids in shoulder extensor strength and shoulder adductor strength, which she needs for serving and hitting in volleyball.

**Conclusion**

The knee is one of the most important joints of our body – particularly if you are an athlete involved in jumping sports like basketball and volleyball. Over time, many basketball and volleyball athletes develop injuries including, but not limited to Patellar Tendonitis – an inflammation of the patellar tendon from overuse. A Pilates Program of exercise can be a real “game changer” for an athlete with Patellar Tendonitis, as it can holistically strengthen & stretch the muscles that support the knee, and the muscles of the entire body. It’s a challenging, holistic program that is gentle on the joints and challenging enough for the muscles.

A Pilates exercise program specifically tailored to the needs of a volleyball athlete with Patellar Tendonitis like my client Andrea, can contribute to better performance on and off the court without worsening the condition.


   http://www.jaaos.org/content/4/6/287.abstract

Krucik, George MD, MBA. *Knee*. April 24, 2013

   http://www.healthline.com/human-body-maps/knee

Cluett, Jonathan M.D *Patellar Tendonitis*. 11 August, 2012

   http://orthopedics.about.com/cs/patelladisorders/a/patellartendon.htm

Core Concepts Musculoskeletal Health Group.  *Patellar Tendonitis*