

Patellar Tendinopathy: Knee Pain Relate To “Jumper’s Knee”

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ABSTRACT

There are common symptoms that are associated with “Jumper’s Knee”, such as pain, aching, and swelling on the lower side of the Patella on the anterior surface of the knee. Addition symptoms may include weakness and cramping of the knee joint. There are common remedies to treat “Jumper’s Knee”, such as rest, ice, compression, and elevation. Anti-inflammatory medicine, such as Aleve, Advil, or Motrin, may be appropriate in the early stages of injury. If the symptoms are left untreated, the final result may be knee surgery. A patient returning to play after diagnoses and treatment for “Jumpers Knee” should apply heat to the knee for 10 or 15 minutes before starting physical activity. Following physical activity, apply ice for 10 to 15 minutes (Donohue, 2008). Conservative treatments assist the healing process and keep Patellar Tendinopathy at bay for more than 90% of cases (Vulpiani, 2007). Along with becoming knowledgeable regarding remedies to relieve symptoms of minor “Jumper’s Knee”, it is important to know the stages of Patellar Tendinopathy. Knowledge of the warning signs and stages may assist in the avoidance of advancing the condition of Patellar Tendinopathy. Knowing the cause of Patellar Tendinopathy, the five stages, warning signs, and risk factors may assist in the process of diagnosing the injury for faster and more effective treatment. Being able to utilize the correct treatment for a particular stage of “Jumpers Knee” reduces downtime and assists the athletic trainers and doctors in the process of prescribing levels of physical activity.

Keywords: Flexibility; Inflammation; High Impact Sports; Jumper’s Knee; Patellar Tendinopathy; R.I.C.E.; Strength Programs

INTRODUCTION

What is Patellar Tendinopathy?

Patellar Tendinopathy, commonly known as “Jumper’s Knee”, is caused by the overuse of the Patellar Tendon. This injury frequently affects athletes involved in jumping sports, which is included in a group of activities that are classified as high impact sports. High impact sports are physical activities that place above normal force on joints, bones, tendons, and ligaments. These high impact sports include basketball, dance, volleyball, soccer, football, track and field (distance running, high- and long-jump), mountain climbing, figure skating, tennis and skiing. Others who may suffer from Patellar Tendinopathy include military recruits. This group is also involved in training activities that stress the knee which makes them more likely to develop Patellar Tendinopathy. “Jumper’s Knee” is most commonly found in the sport of basketball. The overall occurrence of Patellar Tendinopathy among sporting athletes has been estimated at 15% with a higher prevalence of about 50% in elite jumping athletes, such as volleyball and basketball players. The key warning sign of “Jumper’s Knee” is a shooting pain just below the Patella, commonly known as the kneecap, when walking, working out, or performing daily activities. The overuse of the Patellar Tendon represents approximately 15% of all soft-tissue injuries in athletes (Peers, 2005). When Patellar Tendon overuse occurs, inflammation of the Patellar Tendon gradually become more painful. In a survey that was independent of any treatment strategies, one-third of the athletes with Patellar Tendinopathy were unable to practice or participate in their sport for six months (Peers, 2005). Tendon overload

occurs when “forces of 3 to 8% strain are applied to the tendon, which causes microtrauma. Microtrauma is a microscopic injury to connective tissue that may include micro tearing of muscle fibers (Peers, 2005). The forces applied to the knee joint, Patellar Tendon, and other knee tendons when landing may be greater than nine times the participant’s body weight (Donohue, 2008). There are various ways to avoid knee pain, which require strengthening the muscles that surround the knee joint - the Gluteus Maximus, Quadriceps, and Hamstring muscles. The load placed on the knee joint will be reduced, including the forces on the Patellar Tendon, by increasing the strength of muscle groups that surround the knee joint. In addition to participation in a strength program, a conditioning plan that integrates routine trunk and lower-limb stretching and polymetric training to increase endurance may assist in reduction of excessive stress on the patient’s knee. Risk factors that contribute to the injury of the Patellar Tendon are inflexibility of the Quadriceps and Hamstring muscles. Other risk factors include inappropriate quantity and intensity of training, hardness of the playing surface, and limited evidence of inherited biomechanical risk factors (Vulpiani, 2007). Landing and jumping surfaces should be padded to assist in the process of reducing micro tears in tendons, ligaments, and muscle tissue.

FINDINGS

As stated previously, Patellar Tendinopathy - the over usage of the Patellar Tendon, occurs mainly in athletes who participate in jumping and high impact sports. Patellar Tendinopathy may occur when there is rapid acceleration or deceleration, jumping, or landing from a jump. These activities cause inflammation in the knee joint specifically in the Patellar Tendon. High impact sports involve both feet leaving the ground and landing simultaneously or jumping and landing with only one foot using quick movements. Track and field event, such as running or sprinting, tennis, skiing, soccer, and football, are high impact sports that place pressure on the knee joint and the Patellar Tendon. There is a sport that affects the Patellar Tendon greater in male athletes than in female athletes - dancing. Males experience more repetitive jumps in dancing than females (Mattingly, 2005). Patellar Tendinopathy may occur in males between the ages of 14 and 16 who experience a sudden growth spurt, which is characterized by the bones of the leg out-growing the tendons and muscles of the leg. The unexpected athletes affected by Patellar Tendinopathy include military recruits during high impact training. The most common warning signs of knee inflammation are pain, aching, and swelling generated in the location of the Patellar Tendon. These symptoms may be found on the lower side of the patella on the front (anterior) of the knee during walking, jumping, and exercising. Inflammation that occurs during Patellar Tendinopathy may be found in several areas - the top of the Patellar Tendon, the bottom of the kneecap, the bottom of the Patellar Tendon, and the top of the Tibia. The inflammation is caused by overuse of the joint without a sufficient amount of rest (Donohue, 2008). The stages of inflammation are classified according to symptoms using a scale of zero to five, with five indicating the most pain. These stages may assist those suffering from Patellar Tendinopathy to determine the severity of the injury and the amount of activity that can be endured. Referring to Table 1 (Hayman, 2008), Stage one involves mild pain after activity, indicating that more rest is needed, and Stage two involves pain before and after activity, requiring that longer periods of rest may be needed. Stage one and two may respond well to conservative intervention involving therapeutic exercise, ice, ultrasound, cross-friction massage, and rest. Stage three is characterized by pain during activity and the athlete is less able to perform at a satisfactory level. When in Stage three, prolonged levels of rest and the number of activities are limited. Stage four is characterized by increased pain during activity and the inability to perform at a satisfactory level. In Stage four, more treatments may be advised. In Stage five, pain occurs during daily activity and may be unbearable; and in this stage, surgical treatment may be recommended. At Patellar Tendinopathys' worst level, there may be constant pain while at rest or sitting.

Table 1: Classification of Jumper’s Knee According to Symptoms

Stage 0	No pain
Stage 1	Pain only after intense sports activity; no undue functional impairment
Stage 2	Pain at the beginning and after sports activity; still able to perform at a satisfactory level
Stage 3	Pain during sports activity; increasing difficulty in performing at a satisfactory level
Stage 4	Pain during sports activity; unable to participate in sports at a satisfactory level
Stage 5	Pain during daily activity; unable to participate in sports at any level

Source: Hayman, 2008

Exercises and rehabilitation treatments are recommended to reduce suffering from knee pain. These knee exercises consist of strengthening, stretching, and polymetric training. Strengthening the Quadriceps, Hamstrings, and Gluteus Maximus muscles can reduce knee pain and the damaging effects of Patellar Tendinopathy. “When muscle increases in size and strength, the tendon is subjected to less stress” (Kongsgaard, 2007). In other words, the tendon will be able to avoid being overused if the muscles around it are able to take on some of the weight of the activity. Flexibility can be improved by stretching the muscles associated with the tendon to improve range of motion. Stretching on a daily basis, before and after exercise, may reduce stiffness in the joints and remove lactic acid from the muscles. Polymetric training may improve muscle endurance. This type of training will facilitate the muscle in the process of increasing activity and for longer periods of time. Polymetric training increases muscle strength without increasing stress on the tendon, providing more support for the tendon. Some tips to avoid knee pain are:

- Adequate warm-up prior to running or jumping (Dressendorfer, 2007).
- Stretching program to maintain quadriceps and hamstring flexibility (Dressendorfer, 2007).
 - Example: hamstring and quadriceps stretches (Delaney, 1995).
- Strengthening techniques
 - Example: Half-squats and lunges to help strengthen (Delaney, 1995)
- Correct any biomechanical errors in jumping technique (Dressendorfer, 2007)
- Avoid repetitive jumping on a hard floor (Mattingly, 2005).

The above tips are ways to counteract risk factors that contribute to Patellar Tendinopathy. Additional risks factors include inflexibility of the Quadriceps and Hamstring muscles. To counter these risk factors, it is important to strengthen the Gluteus Maximus, Hamstring, and Quadriceps muscles. Additional considerations include the quantity and intensity of training, hardness of the playing surface, and inherited biomechanical risk factors (Vulpiani, 2007). Treatments for Patellar Tendinopathy are constantly being researched, changed and improved.

CONCLUSION

“Jumper’s Knee” affects a wide range of athletes who participate in various activities and sports. However, the range of patients affected by Patellar Tendinopathy spreads past sports. The pain of Patellar Tendinopathy may affect 14 to 16-year old males going through a growth spurt or it may affect military recruits participating in high impact activities during basic training. Before Patellar Tendinopathy symptoms occur, there are important ways to avoid knee pain and injury. Knowing how to avoid knee pain may protect the patient from requiring treatment or surgery. Knowledge of the risk factors that affect a patient may assist in the process of recognizing the precautions to prevent or lessen Patellar Tendinopathy. Common symptoms associated with “Jumper’s Knee” are pain, aching, and swelling on the lower side of the Patella on the anterior surface of the knee. In addition to these symptoms, weakness and cramping of the knee joint may occur. There are common remedies to treat “Jumper’s Knee”, such as rest, ice, compression, and elevation. Anti-inflammatory medicine, such as Aleve, Advil, or Motrin, may be appropriate in the early stages of injury. If the injury symptoms are left untreated, the final result may be knee surgery (Figure 1). A patient returning to participation in physical activities after treatment for “Jumpers Knee” should apply heat to the knee for 10 to 15 minutes before starting physical activity. Following physical activity, apply ice for 10 to 15 minutes (Donohue, 2008). Conservative treatments facilitate the progress of the healing process and keep Patellar Tendinopathy at bay in more than 90% of the cases (Vulpiani, 2007). Along with becoming knowledgeable regarding remedies to relieve symptoms of minor “Jumper’s Knee”, it is important to know the stages of Patellar Tendinopathy. Knowledge of the warning signs and stages may assist in the avoidance of aggravating or advancing the condition of Patellar Tendinopathy. Knowing the cause of Patellar Tendinopathy, the five stages, warning signs, and risk factors may assist in the process of diagnosing the injury and may lead to a more effective treatment program. Being able to utilize the correct treatment for a particular stage of “Jumpers Knee” reduces downtime and assists the athletic trainers and doctors in the process of prescribing levels of physical activity.



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Figure 1: Hughston Health Alert (2007)

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