

Treatment with titration progression resolves quadriceps tendonitis and allows for successful strength training for patella femoral syndrome

Patient Profile

Patient: 60-year-old male triathlete

Complaint: Anterior knee pain and swelling

Symptoms: Began while aggressively training for a triathlon. The patient reported significantly lowering his training mileage and performing a sub maximal quad strengthening program to help improve his quadriceps strength to control his patella femoral syndrome. He was unable to progress without increased anterior knee pain.

Medical History: Surgical repair of right quad tendon rupture 5 years ago

Observation and Assessment

2+ swelling of anterior knee and **atrophy** of quadriceps was observed. An **MRI** revealed mild osteoarthritis of the medial aspect of the knee joint. **Palpation** resulted in pain and crepitus of the patella femoral joint in the 65-20 degree range, severe tenderness over the quad tendon at the inferior medial aspect of the patella, and severe tenderness over the medial and lateral patella retinacular tissues.

Treatment Program Using our Titration Progression

Titration Progression is a gradual method to improve a patient with multiple symptoms or complaints. It provides unambiguous reasons for improvement or exacerbation. This method of progression will: ensure progression, prevent exacerbation create objective standards for progression and increase patient compliance by achieving weekly gains without pain.

- In the acute phase of injury we allow only a minimal change in either the intensity, frequency or duration of the program.
- In the sub acute phases we allow a moderate change in 1 or 2 parameters depending on the patient's progress.
- In the chronic phase we allow moderate changes in 2 parameters depending on the patient's progress.

Acute Phase Goals and Treatment

Goals

Rest; control pain and inflammation; improve healing and create a flexible scar; acute phase titration progression

Modalities

1. Phonophoresis 10% hydrocortisone with pulsed US
2. Gentle transverse friction massage to prevent adhesions/create a flexible scar

3. Ice 4-5x per day for 20 minutes

4. Open patella femoral sleeve to reduce swelling in/around joint

Range of motion and stretching exercises

1. Pain free stretching of quadriceps, hamstrings, hip internal and external rotators

Exercises

1. Pain free straight leg raise program with full quad setting in all planes, including supine with hip in full external rotation
2. Patient performed 2 sets of 15 repetitions 2x per day beginning with a weight that did not reproduce symptoms. As soon as the patient was able to perform 2 sets of 15 he/she increased weight by 1 lb. and continued with this weight until able to perform 2 sets of 15 again.
3. Upper Body Ergometer to maintain aerobic conditioning while resting lower extremities

Sub Acute Phase Goals and Treatment

Goals

1. Increase lower extremity muscle strength while preventing exacerbation
2. Avoid **high patella-femoral contact pressure** activates to control patella femoral pain. The high pressure areas and activities are:
 - a. Loaded open chain knee extensions from 50-20 degrees
 - b. Loaded closed chain activities in greater than 50 degrees
3. Begin quad strengthening exercises in **low patella-femoral contact pressure areas**. The low pressure areas and activities are:

- a. Loaded open chain knee extensions from 90-50 degrees and from 20-0 degrees
- b. Loaded closed chain activities with knee in less than 50 degrees of flexion

Modalities

1. Phonophoresis with continuous US
2. Soft tissue mobilization techniques
3. Moderate pressure transverse friction massage of quad tendon
4. Ice after session

Range of motion and stretching exercises

1. Pain free stretching of quadriceps, hamstrings, TFL, hip internal and external rotators

Exercises

1. Pain free loaded low contact closed chain activities
2. Pain free loaded low contact quadriceps open chain activities (began 2 weeks after patient was able to perform closed chain quadriceps exercises without pain)
3. Began low intensity biking program utilizing Titration Progression
4. Open/closed chain hamstring strengthening
5. Open/closed chain hip strengthening
6. Strengthening of foot intrinsic musculature

Chronic Phase Treatment

1. Weight bearing concentric and eccentric exercise at increasing speeds of contraction. The speed of contraction was determined by joint and tissue response.
2. BAPS training in full weight bearing positions
3. Stationary biking
4. Lower extremity stretching and continuation of exercises from sub acute phase
5. Running on treadmill and/or outside on flat training surfaces only

Return to Activity Phase

1. Functional rehabilitation
2. Plyometric exercises utilizing titration progression
 - a. Jumping on horizontal leg press
 - b. Hopping, jumping and box drills
3. Sport specific training; follow titration progression
 - a. Increase in training routine was first limited by time. Once athlete was able to complete his/her event on flat surfaces then increases in frequency and intensity were allowed

Discussion

The unique aspect of this case was the fact that the patient had patella femoral syndrome and a quadriceps tendonitis. Once the quadriceps tendonitis was identified we were able to understand why he could not progress in his quad strengthening. The quad tendonitis needed to be resolved before a proper strengthening program of the quadriceps could be initiated to control his patella femoral syndrome.

The patient was seen for a total of 19 visits over 6 weeks. His pain and swelling were alleviated and he began his triathlon training without pain. His quadriceps strength at discharge was equal to his uninvolved side.

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