Quadriceps Umbrella with Achilles and Durable Suture (QUADS) Technique for Chronic Quadriceps Tendon Reconstruction

Lauren Schoof, Jose R Perez¹, Nina Douglas Fisher², Dylan T Lowe, Kenneth A Egol³, Laith M Jazrawi⁴ ¹NYU Langone, ²Carolinas Medical Center, ³NYU Langone Medical Center, ⁴Center For Musculoskeletal Care Background:

Quadriceps tendon injuries are rare, accounting for only 1.3% of soft tissue injuries and approximately 25% of knee extensor mechanism injuries. While patients typically present with pain, a large knee effusion and extensor lag, up to 50% of cases are missed in the Emergency Department, as the diagnosis can be limited by factors such as edema, pain, and the insensitivity of radiographs. Partial quadriceps tendon ruptures are more likely to be missed, as patients may retain extensor mechanism function. While most partial ruptures can be successfully managed nonoperatively, these patients must be monitored closely for functional limitations and extensor lag. In both complete and partial ruptures, chronic quadriceps tendon injuries pose a significant challenge, as tendon scarring and retraction, and muscle atrophy limits the ability to perform a direct repair. Multiple surgical techniques used to overcome large gap formation in chronic tears have been reported in the literature. These techniques can generally be placed into three categories based on the extent of soft tissue contracture and retraction: primary repair with or without tissue supplementation, tissue lengthening or advancement with V-Y plasty, and reconstruction with autograft or allograft tendon. Currently, the optimal treatment technique is unknown.

Purpose:

This video overview and case presentation demonstrates a novel technique for quadriceps tendon reconstruction using multiple Achilles allografts and suture anchor fixation.

Methods:

The anatomy, examination, diagnosis, and treatment options for quadriceps tendon ruptures are reviewed. A case of a 77-year-old male with quadriceps weakness and extensor lag in the setting of a partial quadriceps tendon tear treated nonoperatively is presented. He initially sustained bilateral quadriceps tendon injuries after a ground level fall, with complete rupture of the right and partial rupture of the left quadriceps tendon. He underwent successful acute repair using suture anchor technique for the right side. However, despite extensive physical therapy, he had continued weakness and extensor lag of his left lower extremity, and was limited in his ability to walk and complete his everyday activities. After a thorough discussion of risks, benefits and prognosis, the patient elected to proceed with quadriceps reconstruction using multiple Achilles allografts and suture anchor fixation.

Results:

The quadriceps tendon was reconstructed using four Achilles allografts, with robust tension and minimal creep intraoperatively with knee flexion. Post-operative clinical outcome at 3 months showed excellent results with full strength, knee flexion to 130 degrees and a 3-degree extensor lag. He was able to return to unlimited walking and was very satisfied with his overall outcome.

Conclusion:

Quadriceps reconstruction with a multiple Achilles allograft and suture anchor technique is a viable surgical option for chronic quadriceps tendon tears with significant reattraction, atrophy, and scarring. This treatment is an effective method to restore the extensor mechanism and knee function with minimal extensor lag.