

Surgery or physical therapy, that is the question: the aftermath of an accident boarding a plane

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THE ACCIDENT AND A FAMILIAR FEELING

We were ready to board our flight from Birmingham, England to Belfast, Northern Ireland. It was late at night on 21 November 2022. As my seat was towards the rear of the plane, we were directed to use the rear boarding stairs. As I attempted to step up with my left knee already flexed, I heard and felt a double pop along with a searing pain as I fell over into the plane. As the flight attendants assisted me to a three-seated row, I was able to stretch out my now swelling left leg. I was convinced that this pain was related to a muscle tear. Yet it felt somewhat different from the total rupture of my right quadriceps tendon which I experienced in 2013. This time I was able to hobble along in pain, although I required assistance. Nevertheless, I was worried, and I feared the prospect of another surgical repair and long, painful physical therapy journey.

After a short flight to Belfast and a long drive to a northernmost town in County Derry, I discovered that neither an ambulance, emergency services, nor a hospital were available at that time. As I was scheduled to return to the USA on 1 December 2022, I used ice, ibuprofen and a compression bandage to treat myself until I arrived back in Cleveland, Ohio.

ORTHOPAEDIC EVALUATION

Ironically, my primary care physician's office recommended I go to a 'walk-in' orthopaedic clinic which treated acute injuries. My 11-day old accident did not 'qualify' as acute, but the clinic checked to see if there was someone I could see. And there was a physiatrist who specialises in non-surgical Sports Medicine and diagnostic and interventional Sport Ultrasound. Within hours, I was immediately relieved and thankful for the quick, in-office diagnosis (with ultrasound) of a quadriceps muscle and tendon injury. I was also fitted for a brace which stabilised my knee which was still painful and swollen.

An MRI was performed in a few days, and I returned to receive the report. There was extensive damage with near-full and

partial tears of the quadriceps muscle and tendon. Even though I was resigned to undergo surgery, I dreaded the prospect. When I asked to have a physical therapy evaluation, as I could still walk, my physiatrist agreed and referred me to physical therapy for evaluation and treatment.

BLOOD FLOW RESTRICTION THERAPY

Five weeks after the accident, a therapist certified in blood flow restriction (BFR) training and therapy, did the evaluation. We discussed this newer therapy option. As it was described to me and as I found in research articles, I saw it as an alternative option to surgery and standard muscle strengthening when there is pain, weakness and activity restriction. I came to learn that initially BFR was used for muscle development and later an improved understanding led to its clinical applications.

I began to feel hopeful and eager to try this, even though in some ways it sounded counterintuitive. I had mixed emotions. I felt that the ability to exercise in a low load environment would allow me similar therapeutic improvement as high-intensity strength training would. Because of the muscle and tendon damage and my knee flexion limited to only 77 degrees, I was still fearful that surgery would be necessary.

POSITIVE PROGRESS

Non-weight bearing therapy began on 3 January 2023. My first BFR session, 6 weeks after the accident, consisted of isometric contractions of my quadriceps with an inflatable cuff adjusted for exercise between 40% and 80% of arterial occlusion pressure, the pressure where blood flow ceases.^{1 2} With seven sessions of BFR at a restricted blood flow closer to 60% of total occlusion pressure and increasing resistance training, my quadriceps strength began to improve and my knee range of motion by goniometer went from 0 to 77 degrees to 0–119 degrees. I was elated and determined to continue even though the therapy was exhausting!

On 20 January 2023 (9 weeks after my accident), I had a follow-up appointment with my physiatrist. After an examination,

we could both see the improvements as I had no pain, my knee flexion had increased and my walking was unrestricted. The ultrasound showed healing of the tendon tearing, and I had improved muscle strength.^{3 4} Eleven weeks after my accident and after 5 weeks of twice-weekly BFR training, my BFR programme progressed from isometric contractions to weight bearing exercises and squats.

MY OUTCOME

As of 3 February 2023, my knee flexion was 127 degrees and BFR was initiated on my right leg to balance the rehabilitation. My physical therapy ended on 6 April 2023, 19 weeks after the accident. I gained a lot physically from BFR therapy, but my gains were also emotional and social. My success depended on trust and open dialogue with my physician and physical therapist, and I had to be an active, informed participant. I also learnt that musculoskeletal injury consultation does not immediately mean that surgery is the only recourse to healing.

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