

Starting Strength

Back Rehab: A Case Study

by

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During my last deployment I suffered a back injury that left me with a condition known as “Foot Drop”, sometimes called “Drop Foot.” My rehabilitation protocol was unorthodox, my recovery is complete, and this is how I managed to avoid a medical evacuation from a combat zone, return to flight status, and fulfill my mission – without surgery, without a chiropractor, using only a barbell and the determination to get better.

Disclaimer: I am not a doctor, but I know a few. I read a bunch of crap on the internet and I ignored it all. This is my recollection of my experience with foot drop while serving a combat deployment to Afghanistan. I do not propose nor recommend doing what I did, because I have no medical training. My education is limited to a Masters Degree in Computer Science from the University of Boston and I am not qualified to speak from a position of authority or knowledge on this subject. If you are having difficulties, I recommend you see a doctor, post haste, and make up your own mind regarding what is best for you, your body, and your family.

For those unaware, foot drop is the inability to lift the front part of the foot into dorsiflexion. This causes the toes to drag along the ground while walking. It is a symptom of an underlying injury, most commonly nerve damage to the peroneal nerve (1). The peroneal nerve is a branch off the sciatic nerve, the largest nerve in the human body. The peroneal nerves travel laterally along the lateral aspect of the knee to the upper foot. Superior to the peroneal nerve, the sciatic nerve (responsible for innervation of the peroneal nerve) originates between the L4 and S3 and travels down the back of each leg, branching out to provide motor and sensory functions to specific regions of the leg and foot (2).

In my case, I believe that a disc protrusion (bulging disc) or possibly a herniated disc was the culprit. Bulging or herniated discs almost always tear posterior-lateral, owing to the presence of the posterior longitudinal ligament in the spinal canal (3).

A little history regarding my back is necessary to properly understand the situation. From approximately October 2007 through March 2010 my chosen form of exercise was “random exercises done for time,” during which time I injured my back severely enough to prevent my ability to stand more than about 10 minutes without severe pain. I had an MRI performed on my lower back and

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learned that I had a “bulging” L3-L4 vertebral disc, a “severely bulging” L-4/L5 vertebral disc, and a “bulging” L5/S1 vertebral disc. I had arthritic bony protrusions in my vertebrae, along with the typical decreased separation in my vertebral column in the L3-S1 region due to the disc damage found in most active adults over the age of 40. I was sent home with a prescription for Motrin and told not to do any lifting of any sort for a month. A month later I tried another workout involving thrusters and pull ups and again injured my back. The pain was enough that I vomited. Three months later on the advice of Mark Rippetoe I started Linear Progression using the Starting Strength methods. My back hadn't bothered me, until...

A few weeks after arriving in Afghanistan, I was chasing a Personal Record back squat of 405x5. The following is the sequence of events:

- June 25 - I squatted 405x4, my plan was to deadlift 450x5 afterwards, though I was only able to do one rep of the deadlift due to fatigue and lack of rest.
- June 29 - I squatted 375x5x5. My log notes that I felt a “twinge” in my lower back on the 4th rep of the 5th set.
- July 6 - I attempted to squat 380x5x5. I stopped at 355 for a single rep.
- July 9 - I deadlifted 405x3 and felt a “twinge” in my lower back.
- July 10 - My back seized so hard I thought I would vomit while sitting in a chair.
- July 18 - I attempted to squat 390 for 2x3 getting 2, 0, 2, and 305x2x5.
- July 23 - deadlifted 445x5. Log annotates that my back “popped” on the 5th rep and I felt 100% better. That night I couldn't sleep due to the pain my back.
- July 26 - squat 390 3x3 and 305 2x5
- My left toe went numb and I was unable to dorsiflex my left foot.

I cannot pinpoint when I injured my back enough to cause the foot drop. I know that my transfer to Afghanistan drastically changed my environment (obviously), my eating, my daily activity, and my training. The biggest difference was my daily walking increased drastically. This included a 1 mile walk in 75 lbs of gear to the compound I worked in every day. The walk wasn't difficult, but it added stress to my spine with no reduction in training stimulus in the gym. Hydration was tough to maintain in the desert, though I don't think I was particularly dehydrated. Sleep was limited; my typical sleep is 7 hours a night, overseas I was averaging about five hours of broken sleep. Food was limited as well, I lost nearly 25 pounds over a period of 10 months, though this was largely due to a relatively “clean” diet of chicken, vegetables, eggs, some sort of mystery meat, and an occasional ice cream when available.

I initially did not know what to think of my foot situation. I posted it on my log, where it was noticed by fellow Starting Strength Coach Rori Alter who put me in touch with Dr. John Petrizzo. They convinced me that I had a problem. I could not dorsiflex my left foot, and I had lost sensation along the inferior part of my foot and into my great toe. I had numbness along the lateral lower leg, in the calf region, and pain along the lateral thigh that extended from my left glute. If I laid on my back and crossed my left leg over my right knee, the pain was exquisite. Most irritating to me was the inability to dorsiflex my left foot.

My next step was to see my flight surgeon. His diagnosis was simple: I had foot drop, I somehow injured my back, likely bulged a disc, and something needed to be done. I was told that I was no longer

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able to fly, and that he strongly recommended an emergency med-evac to Germany for an operation. I was sent to Level 3 care on the base I was stationed in hopes of an MRI. I was told the nearest working MRI was in Germany, that my situation was serious, and I should probably start to pack my things. I reported back to my flight surgeon and asked for 24 hours to do some research. He agreed, stating that he too wanted to make some calls to a friend that specialized in these matters.

First thing I did was call Mark Rippetoe, and I'll never forget what he said: "Yeah, you've fucked something up back there. But remember, we all heal." We discussed options, concerns, and limitations. I was determined to finish my deployment, and I was equally determined to not suffer permanent damage. After our conversation, I did a little more research, and I returned to my flight surgeon the following day with an idea of what I wanted to do moving forward. I was still walking 2+ miles a day back and forth with 75 lbs of gear, I was still going to the gym and training four times a week. My food intake was normal, I didn't have any difficulties with my bowels, and I was sleeping, more or less. Another doctor friend of mine recommended an aggressive pain management therapy: 800 mg of ibuprofen alternating with 1000 mg of Tylenol alternating every four hours for 10 days. I was eating these like candy.

Together with my flight surgeon, I decided to hold off on the med-evac for 30 days. During those 30 days I wanted to aggressively attack the problem. Our reasoning was sound – permanent damage to the nerve in 30 days was very unlikely, 30 days would provide ample time to allow swelling and inflammation in the area to subside, and if my symptoms got worse, I would report them immediately. After 30 days we would reassess. I was told that I could "exercise according to my pain tolerance", and "don't lift heavy." My question, "Heavy to you, or heavy to me?" The response, "Don't be stupid with this, this is serious." This was August 1, 2013.

Based on my previous experience with my back, my conversation with Rip, and my research, I was painfully aware of one thing – I needed to strengthen my back. I needed to strengthen the musculature that supported my spine, and I needed to do this without further irritation or assault to the injured area. Doing nothing would only serve to eventually atrophy those muscles, and movement and strength were necessary ensure full recovery. I was essentially on my own, no chiropractor, no surgeons, no MRI. I wasn't too worried, but I was concerned.

I started back at the gym the following day. I worked the squat up in sets of five, using pain as my guide. I eventually stopped at 315 for 3x5. This was about 2/3 of my 1 RM, which had been 465 done prior to deployment. I did a set of 2 at 405 on my deadlift. My flight surgeon walked in at the end of the 3rd set of squats and just watched. At dinner he told me that he didn't see anything unsafe about my movement.

A moment to explain my decision to work in sets of 5s. Many who will read this are familiar with the Bill Starr rehabilitation protocol, working sets of 10s, 15s, and even 20s to induce blood flow to the injured area, and prevent scar tissue from forming in a way that ultimately affects full recovery. I started that day with a set of 15. Beyond about 10, movement bothered my back. I did not have injured musculature, I had problems with my spinal structure.

Weight was not the issue; any sort of spinal flexion was the issue. I needed to work up to a reasonable weight and ensure zero spinal flexion. Pain was my guide. I often discuss pain with my clients. "Good pain and bad pain, we all inherently know the difference. Stay away from the bad pain, and don't try to be a hero." And this is exactly what I did.

Recall that I had no access to an MRI or other diagnostic equipment. Working on feel and experience, I worked around the pain, learning as I went. By training sets of 5 at about 60-70% of my max, I felt I was maintaining some level of strength, but most importantly, I was able to train safely,

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without risk of spinal flexion, ultimately training the musculature in my back, and allowing the injured area to heal while I trained. Rip's words, "we all heal" continued to ring in my head.

August 4th my log entry was positive, "Feeling is moving down toward my foot and range of motion in my toe is increasing. I can now dorsiflex my foot, but my toe has limited range of dorsiflexion. I cannot walk on my heels yet, though I believe I will be able to soon."

Over the next month I squatted 3x5 on Fridays. My jumps were based on pain, over the next three weeks I squatted 350, 360, and 370. On August 30, I squatted 380x3x3 and 305x2x5. My comment on my log was, "305 was a smokeshow." Tuesday was the day I focused on my deadlift. I kept the weight around 450 for the month, sometimes I would pull in the low 400s for 5, sometimes I would attempt 470x1. Most days I went by feel. If the back was tender, I was compromised, or movement wasn't crisp, I stopped. Over the month I pulled 465x3, 455x1, 455x3, and ended the month with 455x3. Additionally, I did barbell rows from the floor, 3x5 on my bench day (Friday). I started with 225 and added 5 pounds every week. I mention these because with the barbell row, I was forced to keep my back in extension while doing a relatively dynamic movement as compared to the deadlift. On Mondays I pressed, with no change in programming there. At the time I was working with between 190 and 225 pounds depending on the day.

Interestingly, I found the deadlift to be the best therapy of all. A properly performed deadlift is done with the back in extension, with absolutely no rounding of the back. My maximum deadlift was 575, training in the 70-80% range allowed me to maintain an anatomically correct back position, once again while maintaining some semblance of strength. Squatting was more problematic for me during this period than the deadlift. The slightest movement of my spine resulting in flexion from a momentary lack of concentration or focus would send a shooting pain into my leg. I found the deadlift to be safer. I believe this is due to the shorter range of motion, and the ability to stop mid-rep and bail eccentrically instead of having to fight through a concentric movement to get out from under a loaded squat bar. Spotters were often rare given my schedule at the time.

What I had found during this phase of training has been very important to my understanding of the squat and deadlift. A properly performed deadlift is a powerful exercise that strengthens the back, prevents injury, and ultimately heals an injured back with limited exposure to risk. Notice I said, "properly performed deadlift." I was unable to train with more than 470lbs, 80% of my maximum and execute a "proper deadlift." Again, I chose to work a rep range of 5s because I wanted to strengthen my back. I would test higher numbers, ultimately stopping before 5 to avoid any risk to my already injured back.

My focus remained the same. I would finish my combat tour. My medical resources were also the same, I had none.

I felt better on days that I trained. I experienced muscular fatigue, but I was rarely "hurting" from the injury as a result of the training. While sitting in the office or moving about my daily routine, I would perform a few other movements. Specifically, I would do 5 sets of plank holds for 30 seconds, 5 sets of 10 bridges, and finally I would lie on my back with knees bent and squeeze a ball for a 10 count, followed immediately by having someone hold my knees together while I tried to spread them, also for a 10 count. I don't know how much these movements helped my overall recovery, but they did provide me some immediate relief. Initially, I performed these movements 4-5 times a day. As the weeks went on, I did them less and less until finally, by the end of the month I wasn't doing them at all.

At the end of the first month, I was able to dorsiflex my foot, but not through a full range of movement. The numbness on the lateral side of my leg was gone, and some of the feeling was back in

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part of my great toe. On September 19, 2013 I posted, “The toe is about 99%. I don’t have strength in the dorsiflexion of the great toe, but I can dorsiflex it.”

One of the requirements to stay in the Marine Corps is passing a Physical Fitness Test (PFT) which includes a 3-mile run. On September 20, I ran a PFT, posting 25:32 on the run. It was my first run in about 4 months. Prior to doing the run, my flight surgeon had me walk on my heels, something I was unable to do 6 weeks prior. I don’t remember when I regained full feeling in my toe, but I know that I was 100% before the end of October. My flight status was eventually restored, and I was returned to flying combat missions. I finished the entire deployment, and I can honestly say that I am stronger now than I was at the time of my injury, though it certainly slowed my progress.

Why did I elect to forgo surgery? Because the damage was already done, and frankly, I didn’t want someone opening me up and messing around with anything close to my spine. I was serious about my desire to finish my deployment; surgery would mean going home early. And finally, all available information indicated that 30 days was not enough time to cause permanent nerve damage.

Which part of my training was the most effective to achieving my full recovery? All of it, and no part of it could have been left out. I trained my body as an integrated machine. Performing the press while standing on my feet and balancing 200+ pounds overhead worked my spine stabilizers and played a role in my recovery. Flexion of the spine under load was painful and avoided. My spine under load held rigidly in place was not uncomfortable. By working my spine stabilizers in the gym, I was better at protecting it while moving around through my daily activities, and I believe I had less pain as a result.

I was fortunate. I had a support network around me, a flight surgeon who was willing to let me make my own decisions regarding my body (within reason), and I had access to a barbell. The damage is done, and “we all heal.” I believe these three words provided more hope for me than anything else. I believe that motion is lotion. I believe that my calculated movement through a full range of motion, slowly increasing stress with pain tolerance as my guide allowed me a speedy recovery, put me back on full duty in 45 days, and prevented surgery. Surgery would have been more immediate in relief at the discs – if it had been successful. But how long would the recovery have been? Way more than 45 days, in my opinion. And remember, my opinion is worth absolutely nothing.

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