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Evaluating the Effectiveness of Therapy Interventions on a Patient Who Underwent a Spinal Thoracic Abscess Removal: A Case Report

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EVALUATING THE EFFECTIVENESS OF THERAPY INTERVENTIONS ON A PATIENT WHO UNDERWENT A SPINAL THORACIC ABSCESS REMOVAL: A CASE REPORT

by

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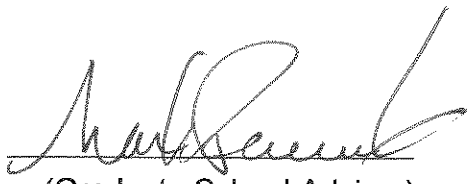

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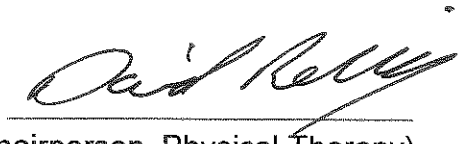

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ABSTRACT

Background and Purpose: An epidural abscess comes from an infection of the central nervous system. In this patient's case he had a spinal thoracic abscess removed that was pushing against his spinal cord. The purpose of this case report is to assess the patient's outcome after therapy implementation. The goal was to see how effective the interventions were for the patient.

Case Description: The patient was a 63-year-old male who underwent surgery to remove a thoracic epidural abscess that was causing paraplegia. He was coming to outpatient physical therapy 2 months before I started my clinical treating him. Prior to the abscess removal, he had no medical history and was fully independent. He had difficulty with ambulation, balance, bed mobility and transfers after the abscess removal.

Intervention: The interventions performed with this patient were gait training, therapeutic exercise, neuromuscular reeducation, patient education, bed mobility, and transfers.

Outcomes: Following 9 weeks of outpatient physical therapy interventions with 14 visits. He became independent with all bed mobility, transfers, and could ambulate in the community. He had increased his endurance and his lower extremity strength.

Discussion: Research shows that the Berg Balance Scale is a strong assessment for standing balance for individuals with a spinal cord injury. I used this assessment at the beginning and end of his physical therapy treatment to assess my patient's improvement. My patient was motivated to accomplish his goals and use his low Berg Balance Scale score as a motivator to improve.

CHAPTER I

BACKGROUND AND PURPOSE

An epidural abscess comes from an infection of the central nervous system (CNS). Abscesses can develop in the skull, spinal column, or can expand to compress the brain or spinal cord and cause severe symptoms, permanent complications, or even lead to death. An immediate diagnosis and the appropriate treatment can prevent the complications from becoming worse or cure the person completely.[1] Spinal epidural abscess is a uncommon but can be a devastating condition.[2] To treat the epidural abscess, it usually includes a surgical procedure for aspiration or drainage of the abscess, and is often seen by different imaging techniques, such as computed tomography (CT) and often magnetic resonance imaging (MRI). There are two different types of epidural abscesses, spinal epidural abscess (SEA) and intracranial epidural abscess (IEA). The most common type is SEA by a factor of nine to one. To identify which type of abscess it is can be determined based upon the anatomy of the two locations within the CNS and also in the symptoms portrayed by the patient. [1] "The pressure of the abscess on the spinal cord will sometimes cause neurological problems, such as lower-body paralysis and loss of sensation below the area of the abscess."[3] A research study assessed if the number of repetitions done in therapy sessions approaches the number that yields neurological change

in neuroplasticity research. In an animal following an induced stroke 400 to 600 repetitions per day can lead to structural neurological change in upper extremity function. In lower extremities (LEs) it is suggested approximately 1,000 to 2,000 steps per therapy session is required. There were 48 participants involved in the study following a stroke or TBI. The conclusion to this is that the number of repetitions per session does not reach that implemented in neuroplasticity research. If sessions are organized so as to maximize repetitions, the patient will be more likely to rebuild necessary cortical pathways through neuroplasticity and achieve greater functional improvement.[4] A randomized trial with 36 participants with COPD were recruited into either a walk or cycle training group. Both groups trained indoors for 30 to 45 minutes per session, 3 times a week over the course of 8 weeks. The first outcome measure used was the endurance shuttle walking test (ESWT) to measured endurance walking capacity. The second outcome included peak walking capacity, peak and endurance cycle capacity, and health-related quality of life. The results showed the walk training group increased their endurance walking time by 279 seconds more than the cycle training group. In conclusion, the ground walk training group increased endurance walking capacity more than the cycle training group.[5] The purpose of this case report is to assess my patient's outcome after therapy implementation. Through this case, I will describe the interventions performed with for the patient. I will also look at the importance of maximizing the number of steps my patient takes at every treatment session to gain a neurological change.

The patient was a 63-year-old male who was admitted to the emergency outpatient department early March because of increasing low back pain, increasing leg weakness, and eventually the inability to walk, all taking placed within the prior 24 hours. The patient reported to the doctor a weight gain of 20 pounds over 3 months, prior to the emergency admission. He had a loss of bladder control, numbness in his LEs, decreased sensation, and hyperactive LE reflexes and he had a positive sign of Babinski. He displayed substantial weakness to the point that he could not support himself. He denied any fever, chills, systemic symptoms, vomiting, diarrhea or other problems. The patient had an MRI with an identification of a thoracic spinal epidural abscess (SEA). He went into surgery immediately and approximately 1 gallon of fluid was drained out of his spinal column. After the thoracic epidural abscess was removed he was admitted to a transitional care unit (TCU) due to paraplegia related to the epidural abscess to undergo physical therapy. After a few weeks being hospitalized, the patient was admitted to the transitional care unit (TCU) to undergo physical therapy. He was noted from the physical therapist during the time that he was alert; did not appear to be in acute distress; was oriented to person, place, and time; and he displayed remarkable weakness in both his LE's and he used a wheelchair.

CHAPTER II

CASE DESCRIPTION

Examination, Evaluation, and Diagnosis

Examination

The patient was a 63-year-old male who was a Native American with his first language being English with a master's degree in education. He underwent surgery in March of 2014 to remove a thoracic epidural abscess that was causing some paraplegia. After being in the TCU for a couple months, he was admitted to outpatient physical therapy to continue rehabilitation. His past medical history is diabetes mellitus (DM), benign prostatic hyperplasia (BPH), MRSA and epidural abscess. During the physical therapy examination, the patient presented with spasticity, myelopathy, and neuropathic pain since the epidural abscess was removed. He lives with his wife in a 2-level home with access to a ramp entering the home. He has 4 children out of state and 4 children that live within a 30-mile radius. The patient's family medical history is unremarkable. His primary method of mobility and transferring from place to place is using his wheelchair. His wife is the main caregiver and drives him to his appointments, activities and work. The patient is involved in social activities in the community such as darts, basketball games, and likes to go out to eat at restaurants with family. The patient is a program director at the state college where he organizes and plans all of the

activities. His job involves a lot of sitting at his office desk and he uses his wheelchair as his office chair at work. He does not get out of his wheelchair during his work hours and states that his legs cramp up and get very stiff behind his knees from sitting too long. The patient stated he experienced pain everyday in both of his legs to be a 2/10 (0=no pain, 10=extreme pain) according to the verbal pain scale. Along with the pain, he stated he felt stiffness behind his knees. During the examination, he was not independent to stand up out of his wheelchair by himself. The patient owns a front-wheeled walker (FWW) and could ambulate with contact guard assist (CGA), and is able to use the FWW in the bathroom at home for toileting. The patient used the sliding board to transfer in and out of the car. He denied any use of alcohol, caffeine, or cigarettes. For many months after the surgery, he slept in a recliner every night until he became independent in his bed mobility. He stated he wakes up at least 2 to 3 times a night due to severe muscle cramps in his LEs and more specifically his hamstrings. He has only been taking aspirin 81 mg by mouth daily. Prior to the abscess, the patient was independent and did not use an assistive device (AD) and he would walk his dog 3 miles every day. Before the abscess removal, he was independent in activities of daily living (ADL's), community/social activities, and driving. His wife is there to assist him with ADL's, cooking, dressing, driving and other home activities. The patient reported he did his sitting exercises at work first thing in the morning at his work desk. He was focusing more on strengthening his hips and increasing his lower extremity range of motion. His wife assisted him in stretching every night for 10 minutes on each leg.

After taking vitals from the patient, his resting heart rate was 72 beats per minute, resting respiratory rate 16 breaths per minute, resting blood pressure 124/68 mmHg. Normal healthy adult vital signs: 12 to 20 breaths per minute, resting heart rate 60 to 100 beats per minute, and blood pressure 120/80 mmHg.[6] None of his vital signs raise concern to treat him. He displayed moderate edema in bilateral ankles and was prescribed to wear compression stockings during the day and to elevate his LEs at night. He appeared to have no skin color changes and no scar formation. His sensation is fully intact. His height is 5'10", weight is 219 pounds. BMI is 31.42 kg/m^2. Both of his knees are hyperextended and he displayed clonus on his right foot.

He was able to sit with his back unsupported and his feet supported on ground for 2 minutes and he could stand with his FWW and upper extremity support for 3 minutes. He could ambulate with FWW, CGA for 20 minutes on a level surface. He was not able to ascend or descend stairs but is independent in his wheelchair. As far as his bed mobility, he was able to transfer performing a lateral scoot to get from a chair to another chair and he can perform a standing pivot transfer using the FWW to go from standing to sitting. At the time of evaluation, he could not lie prone or on his side. He was able to sit to stand with increased time using his FWW. He was independent from sit to supine with some extra time needed. The patient had no communication barriers, he was alert, and followed directions appropriately.

After I tested him, he appeared to have sustained clonus on the right and a couple beats on the left. The Berg Balance Test was performed and the patient

scored a 9/56, which placed him in the category of wheelchair bound. A score of less than or equal to 20 is considered wheelchair bound, 20 to 40 is walking with assistance and a score between 40 and 56 is considered independent.[7] Reflexes are graded on a scale of 0-4, 0=absent, 1+= trace, 2+= normal, 3+= brisk without clonus, 4+=hyperactive with clonus.[8] After testing his biceps reflex (C6) = 3+, patella reflex (L3)= 4+ bilaterally. The patient had full, intact sensation and no numbness or tingling in both LEs. I did not test the Romberg or tandem gait with my patient. Finger-nose-finger coordination displayed normal bilaterally. I tested his gross manual muscle testing bilaterally the 1st and the 12th visit (see Tables 1 and 2). Manual muscle testing is graded on a 0 to 5 point scale. The grading means 0=no muscle contraction, 1=trace, palpable muscle contraction 2=poor, moves through partial range of motion 3=fair, moves through full range of motion 4=good, holds against slight resistance 5=normal, holds against maximal resistance.[9] I tested his hamstring length because I realized he was not able to fully extend his knees. A positive test to the 90-90 straight leg raising test is if the patient is unable to extend the knee to within 20 degrees of full knee extension.[10] The patient had a positive test on the right side which indicated he had hamstring muscle tightness.

Table 1: 1st Visit Lower Extremity Test and Measures		
Initial Exam	**Left Side**	**Right Side**
Hip Flexion	4+/5	4-/5
Hip Abduction	2/5	2/5
Knee Flexion	5/5	4-/5
Knee Extension	5/5	5/5
Hamstring Length (90/90)	11 degrees	21 degrees

Table 2: 12th Visit Lower Extremity Test and Measures		
12th Visit	**Left Side**	**Right Side**
Hip Flexion	5/5	4/5
Hip Abduction	2+/5	2+/5
Knee Flexion	5/5	4+/5
Knee Extension	5/5	5/5
Hamstring Length (90/90)	5 degrees	10 degrees

The patient improved by the 12th visit over the course of his treatment. He has increased his strength and range of motion in his LEs through the LE strengthening exercises performed.

Evaluation

Through the examination process, I could conclude that the patient had poor balance. During the initial visit, he was unable to ambulate out of the physical therapy department no more than 125 feet, and he displayed a decrease in cadence with his gait the first time I examined him. Through every physical therapy session, he began to progress in increasing his ambulation distance. He was unable to independently perform self-care and home management activities. He displayed high tone and clonus in both lower extremities. His endurance was very poor due to inactivity over those months after surgery and he remained wheelchair bound. His two main functional limitations were lack of strength and poor endurance.

Diagnosis

Preferred practice pattern: 5H: Impaired Motor Function, Peripheral Nerve Integrity, and Sensory Integrity Associated with Non-progressive Disorders of the Spinal Cord.

Medical diagnosis ICD-9 Code: 336 Other diseases of spinal cord. 781.0 Spasticity. 336.9 Myelopathy. 729.2 Neuropathic pain.[11]

Prognosis and Plan of Care

The physical therapy interventions I chose were therapeutic exercise, strengthening his lower extremities, stretching lower extremities, gait training, and neuromuscular re-education. I planned to see him 2 times a week, for the duration of 45 to 50 minutes, for 3 months. Long-term goals (2 to 3 months): 1.

Patient will display a normal gait pattern with an appropriate assistive device so he is able to perform all work activities. 2. Patient will have 5/5 in all lower extremity muscle strength so he is able to improve his quality of life. 3. Patient will demonstrate an 11-point improvement on his Berg Balance Scale for improved balance and functional mobility.

Short-term goals (1 month): 1. Patient will be able to ambulate 200 feet with a front wheeled walker (FWW), and CGA. 2. Patient will be able to stand without upper extremity support for 1 minute to improve his balance. 3. Patient will be independent in bed mobility in pronelying, quadruped, sidelying in order to sleep in his own bed at night. 4. Patient will have good endurance so he is able to participate in community and social activities.

CHAPTER III

INTERVENTION

Through the course of treatment, I had the opportunity to work with this patient and I performed many different interventions with him throughout therapy. I started working with this patient on his 36th physical therapy visit. The first day, I started him on the stationary recumbent bike as a warm up for 12 minutes and no resistance was needed. We worked on transferring him using a sliding board and laterally scooting from the wheelchair to the bike. With CGA, he approached the bike on the right side with his strong left lower extremity towards the bike. Once he was on the bike, he needed assistance moving his right foot onto the pedal of bike due to excessive clonus and involuntary control of his right foot. To transfer off of the bike, he used his FWW on the opposite side of the bike seat to get off. He was able to ambulate 3 feet to the therapy mat using the FWW. To transfer onto the therapy mat, he performed a standing pivot with his FWW onto the mat. I began passively stretching his lower extremities in supine: hamstring and calve stretch 3 times for 45 seconds bilaterally. It is important to regularly stretch the muscles, to counteract that shortening. By Stretching it will promote flexibility, and allow him to move his muscles and joints through their full range of motion.[12] I worked with him on strengthening his LEs with some different exercises. He did standing full squats with bilateral upper extremity (BUE) support at the bar and

used the mirror to correct his body alignment. He performed standing hip abduction 7 times bilaterally with BUE support and increased effort. The patient was motivated to increase his endurance and increase his ambulation distance through gait training. He was able to ambulate 100 feet in the physical therapy hallway using his FWW, CGA and it took him a total of 14 minutes. His knees displayed excessive hyperextension with gait, so I would cue him to focus on bending his knees and stepping through each step.

Day 2 intervention, he reported extra stiffness behind both knees so I started him on the stationary recumbent bike to warm up his muscles and decrease some of his stiffness. He was at a resistance level of 2/10 for 12 minutes and again needed assistance to put his right foot on the pedal after he mounted the bike. He performed a standing pivot with his FWW to the therapy mat to do LE stretching. We started with a hamstring/heel cord stretch bilaterally 3 times holding for 45 seconds to decrease stiffness and increase range of motion. His core was weak and needed to be strengthened; so we focused on supine exercises for his core and LEs. He performed bridges with increased effort to clear mat fully 2 sets of 10 repetitions, straight leg raises (SLRs) bilaterally 1 set of 10, and short arc quads (SAQs) 1 set of 10. We also did standing LE exercises to increase his weight-bearing with full squats 1 set of 10 and standing hip abduction 1 set of 8. Gait training in hallway with FWW, CGA 120 feet for 12.5 minutes and instructed the patient to look straight ahead with ambulation. Our goal is to get him to improve his gait and have a step-through gait pattern.

Day 3 intervention, I initiated physical therapy with him on the stationary recumbent bike for 10 minutes for warm up; he still required assistance to put his right foot onto the pedal due to increased clonus in LEs. He performed a standing pivot to turn around to sit on the therapy mat with stand by assist (SBA). The patient was not able to lie prone independently to stretch his hip flexors. We performed the same stretches as the previous therapy sessions, stretching his hamstring/calf muscles 4 times and held each stretch for 45 seconds with the patient supine on the mat. The patient's right hamstring was tighter than his left, so I stretched his right hamstring into end range with overpressure and his RLE would kick back involuntary. I had him perform supine mat exercises: bridges 1 set of 10 trying to improve clearance of hips off mat and to increase core stability, SLRs bilaterally 2 sets of 10, 10 crunches with assistance of my hands holding onto his. The patient ambulated 120 feet with FWW, CGA and I followed him from behind with the wheelchair in case he fatigued quickly. He displayed an increase in his cadence and completed gait training in 11.5 minutes, which was his record time. He overall was showing progress in his time for ambulation distance since his last physical therapy visit.

On the 4th visit we continued with our same warm up as before using the recumbent bike for 10 minutes. He still needed assistance with moving his right foot onto the bike pedal, and I would hold his foot in place until he could control his feet through a few cycles. I performed the same stretches as before with him on the therapy mat to increase his range of motion in his LEs. While he performed 10 bridges in supine, he was able to get full contraction in his hip

extensors to clear the therapy mat. Other exercises he performed were SLRs 2 sets of 10, supine hip abduction 1 set of 10, crunches 1 set of 15. The patient ambulated his farthest distance with walking 160 feet with FWW, CGA with no rest breaks completing it in 14 minutes. I focused more on giving him cues to improve his gait by instructing him to focus on bending his knees to prevent them from locking and giving out. He increased his distance that session and completed his gait training in 15 minutes. His 5th physical therapy session with me was the same as day 4 with minimal improvement only in his ambulation distance time, which was ambulating 160 feet in 12.5 minutes. The 6th visit we performed the same stretches and he was still not able to move into prone position. He broke his ambulation record distance by ambulating 200 feet in 20 minutes with FWW, CGA. On his 7th visit, I switched things up and had him completing balance activities. He started with standing in one position with his feet as close as they could be inside his FWW. He was able to hold this position for 3 minutes before he could not stand any longer without feeling unsteady. To improve more of his balance, I had him sit upright in his wheelchair without his back touching the back of his chair and hold it for 3 minutes. We did more balance activities standing with CGA and I had him rotate his upper trunk turning over each shoulder still using BUE support on his FWW. By doing that, it also helped him become more confident with weight shifting. He tolerated the balance activities well but found it challenging. The 8th and 9th visit I had him complete strengthening exercises for his LEs and stretching in supine. The 10th visit we warmed up on the recumbent bike for 12 minutes and he did not need any

assistance for the first time with placing his right foot onto the pedal. We went straight into gait training after and he ambulated his farthest distance 310 feet with FWW, CGA with a completion time of 30 minutes. I emphasized and educated the patient on the importance of ambulating everyday with his wife assisting him to build up his endurance outside of the physical therapy department. On his 11th visit, we started with the warm up on the bike for 10 minutes and went into gait training after. He was not able to ambulate more than 100 feet and complained of excessive pain and stiffness behind his knees. He wanted to see how his body reacted by not taking his muscle relaxants for 2 days. I stretched his LE's the rest of the therapy session to decrease his pain and get him to relax. The 12th visit he complained of no pain or stiffness in his legs for the first time. Therefore, I had him focus on increasing his walking distance and trying to coordinate his steps. He ambulated the farthest distance, which was 250 feet with FWW, CGA in 25 minutes. I ended the session with stretching his quadriceps and hamstrings in his wheelchair. He has been progressing in his ambulation distance and has increased his overall lower extremity strength. On the 13th visit with him I had him warm up on the bike and he didn't need any assistance with transferring that day. I worked on bed mobility with him and for the first time he was able to lie prone and transfer independently back to supine. He used the log roll technique to transfer between positions. His quadriceps were tight; I spent time with him while he was in prone position to stretch him. We stretched quadriceps 4 times holding 45 seconds each. We ended the session with a lot of standing lower extremity strengthening exercises: standing mini

squats 3 sets of 10 with BUE support at bar and patient had 1 rest break in wheelchair between sets, side stepping 1 set of 10 leading RLE, side stepping 1 set of 10 leading LLE with BUE support at bar. The patient had difficulty clearing his feet off the floor with sidestepping. We worked on exercises to increase his core strength by doing a knee half plank on forearms and he was able to hold for 2 times for 1 minute. We ended the treatment session with elevating and icing his LEs because of increased edema in his ankles. The 14th physical therapy session was the last time I got to work with him. I retested his balance using the Berg Balance Test and he scored a 13/56 and that is 4 points higher than when I first evaluated him. He completed a short warm up on the bike for 5 minutes to loosen up his muscles. He walked 300 feet, and that was his farthest distance ever in physical therapy. After walking the distance, I stretched his quadriceps and hamstrings. I decided to have him try doing some rhythmic stabilization and pelvic tilts in quadruped position to re-educate muscles around his trunk and pelvis to increase movement through the pelvis. I also had him crawl across the mat in quadruped and he found it very challenging to weight shift moving forward on the mat.

CHAPTER IV

OUTCOMES

Following 9 weeks of interventions with 14 physical therapy treatments. The patient's endurance improved through increasing speed and resistance level on the recumbent bike every day and furthering the patient's ambulation distance. He was able to ambulate in the community using his FWW and not just in the physical therapy department. He still displayed hyperextension in both knees, which makes it difficult to have an optimal gait pattern. The patient no longer needs to sleep in a recliner every night because he is now independent in bed mobility and all positional transitions between quadruped, half kneeling, supine, prone, and sidelying. His strength has improved in his lower extremities and has helped him functionally perform tasks he wasn't able to do before, such as, bed positioning independently. His Berg Balance Score improved by 4 points throughout the time I treated him. He has improved with his Berg Balance Score but is still considered in the "wheelchair bound" category. He no longer complains of any pain or stiffness in his lower extremities, although, he still has to elevate his lower extremities at night due to edema in his ankles. The patient has increased his LE ROM in all motions, making his ADLs less difficult, for example, dressing and putting his pants on. By the end of treatment, he was able to increase his ambulation distance to 250 feet, improving from125 feet. He is more

confident with walking outside of physical therapy and started walking in public with his FWW and with supervision from his wife. The patient achieved all of his short-term goals we had set for him, but did not achieve the long-term goals by the time I finished this clinical. By the time I ended my clinical with working with this patient he had been in physical therapy for 8 months. There was no set time on discharge for this patient because of where he was functionally and he had not yet met his long-term goals.

CHAPTER V

DISCUSSION

With every physical therapy treatment, I always made it my goal to try to increase the patient's distance. I found it beneficial to start out on the bike as a warm up and end the treatment with gait training. The patient experienced a lot of LE hamstring stiffness with muscle cramps but I spent time on stretching his hamstrings every treatment. I found a longitudinal and correlational study with repeated measures that aimed to test the concurrent validity of the BBS for a spinal cord injury population. By evaluating my patient's balance using the BBS, it correlated significantly well with all the walking aspects assessed in the study. All walking tests were highly correlated with the BBS being the best test used. A significant ceiling effect was found on the BBS. The assistive devices used for walking relate best to the Berg Balance Scale. These results support the use of BBS as a strong assessment of standing balance for individuals with spinal cord injury (SCI). A normal standing balance is connected to a normal gait pattern. Complementary evaluation with the 10-minute walk test or the 2-minute walk test is recommended to supplement the ceiling effect on the BBS. [13] I chose the BBS in the clinic to assess my patient's balance. I feel this assessment was a great tool to use with his spinal cord condition and he had very poor balance because of the nerves being damaged from surgery. My patient scored very low on the

Berg Balance Scale. After my patient knew he had scored low on the BBS, he knew what he needed to improve on and that motivated him to strive for a higher score the next time we assessed his balance. We focused more time on his dynamic and static balance. A research study to back up my intervention studied changes in muscle mass and lower extremity body composition that could be induced with regular sessions weekly of functional electrical stimulation (FES)-induced lower-extremity cycling. This study was to determine changes in muscle mass among the quadriceps, adductor longus, and gracilis muscles in individuals with SCI. The results showed from the FES-induced cycling exercise program that these thigh muscles showed an increase in muscle mass as well as the calves. The following muscles showed an increase in muscles mass, rectus femoris (31%, $p<.001$), sartorius (22%, $p<.025$), adductor magnus-hamstrings (26%, $p<.001$), vastus lateralis (39%, $p = .001$), vastus medialis-intermedius (31%, $p = .025$). The muscle mass of adductor longus and gracilis did not change in percentage of muscle mass. Comparing the ratio of muscle to adipose tissue showed significant increases in the thighs and the calve muscles. There was no correlation between the total number of exercise sessions performed weekly and the amount of muscle hypertrophy. The muscle to adipose tissue ratio of the lower extremities increased from the FES-induced cycling exercise program performed weekly. The distribution of changes in muscle mass was related to the proximity of muscles to the stimulating electrodes.[14] The patient used the recumbent bike to warm up his muscles, improve his endurance and increase his LE strength. After reading this study, I wish I had tried this FES-induced exercise

program for my patient's case to increase his muscle strength faster in both LEs. After a few weeks of using the recumbent bike I didn't see a lot of gains in his strength and this would have been a beneficial addition to promote an increase in his muscle performance. It is important for anyone in his condition to remain active and healthy. We performed gait training as an intervention almost every physical therapy visit so he could improve his ability to walk independently. Research shows that the ability to walk again after a spinal cord injury is based on a number of different factors: level of injury, severity of injury, time since injury, age, level of fitness, other injuries, level of sensation, and level of pain.[15] Self-paced gait speed is the most common outcome measure for gait training strategies and reflects the ability to transport the body from one place to another in a timely manner.[16] Larson[17] did a study on the effectiveness of intense, activity-based physical therapy for individuals with spinal cord injury in promoting motor and sensory recovery. They worked with patients 3 to 5 times a week, which is twice as much as I worked with my patient. The study compared patients that participated in therapy either for longer durations, more hours per week or shorter durations, less hours per week. The results of this intense activity program showed greater results for the group that participated more than 4 months and less than 7.6 hours per week. It is known that patients with spinal cord injuries need more times for these nerves to regenerate.

Reflective Practice

The patient was diagnosed with a spinal thoracic abscess and after his surgery he was paralyzed in both lower extremities. He is unlike any other patient

I have ever worked with and I have not been exposed to any condition like his before. I hadn't decided he was going to be one of my case patients until halfway through my physical therapy sessions with him. If I could go back, I would have further researched people who had undergone surgeries like this and looked into more treatment options. There were many times my clinical instructor was not with me when I was treating him and it would have been helpful, looking back, to have a second set of eyes to correct things I may have missed with my lack of experience in the clinic. If I could redo the way I designed my plan of care for this particular patient, I would look in greater detail into his individual characteristics and functional abilities. I realize he has diabetes and I didn't take into consideration that people with diabetes can have a slower recovery. An observational study was performed looking at diabetes impact on routine activities predicts slower recovery after a surgery. They found that pain was higher and function was lower with patients who had diabetes.[18] In the future, I will focus more on the individual, including the diabetes factor, rather than the diagnosis when choosing specific interventions for my patient. In conclusion with working with this patient, he was a lot farther along in his recovery than the medical staff had anticipated. He had greater outcomes with walking, sooner than expected, being a patient with an upper motor neuron lesion. He returned quickly to his everyday activities. Overall, he was able to progress and meet his short-term goals because he was motivated, healthy, wanted to be independent, and had strong family support to meet his goals. I believe these driving forces motivated him to progress further along than anticipated by medical staff. With

providing interventions like gait training, almost every physical therapy appointment he was able to further his distance and become more confident in public. I was only seeing the patient 2 times a week and if I could go back I would have changed his plan of care in treating him 3 times a week. Some weeks he was only able to attend one appointment, which seemed like he would take a step back in his endurance. He didn't start ambulating outside of the physical therapy department until the 2nd month working with him. He needed assistance and a closed environment for ambulation. My clinical instructor and I both agreed it was safe for him during that time to only ambulate with us in the department for that time. I felt we could have made faster progress by seeing him one more time a week. According to the American College of Sports Medicine it is recommended to perform aerobic exercise 3 to 5 times a week for 30 to 60 minutes.[19] He was not able to ambulate a 3rd time every week without our assistance, it would have benefited him to come in one more time a week. It is also especially important for people with diabetes to exercise 30 to 60 minutes a day to control their insulin levels.[20] He was not getting enough physical activity a week on his own.

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