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A Case Report of Guillain-Barre Syndrome

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A CASE REPORT OF GUILLAIN-BARRE SYNDROME

by

Jonathan Tyre

A Scholarly Project Submitted to the Graduate Faculty of the

Department of Physical Therapy

School of Medicine and Health Sciences

University of North Dakota

in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

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This Scholarly Project, submitted by Jonathan Tyre in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

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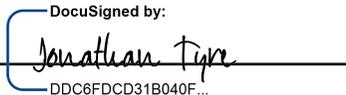
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ABSTRACT

Background and Purpose: Guillain-Barre Syndrome is a medical condition with no known cause. Incidence of this condition is 1 to 2 per 100 000 people in the United States. Guillain-Barre Syndrome is a condition in which a person's immune system attacks the person's nervous system and demyelinates nerves in a person's body.

Case Description: The patient is a 64-year-old male who received physical therapy services following a diagnosis of Guillain-Barre Syndrome. The condition came on with insidious onset and the patient had no signs or symptoms prior to his diagnosis. The patient was evaluated and treated by my clinical instructor (CI), who is a licensed physical therapist, and me, with subsequent treatment sessions being performed by me. I treated the patient for four weeks before my clinical experience finished.

Interventions: Physical therapy interventions focused on improving strength, range of motion (ROM), transfer training, and gait training.

Outcomes: Over the course of his physical therapy treatments in a transitional care unit, the patient made improvements in strength, range of motion, transfer training, and gait training. He met some of his long-term goals and short-term goals while I was there. He was still receiving physical therapy services following the completion of my time at the transitional care unit.

Discussion: PT evidence supports patient progress with Guillain-Barre Syndrome to improve strength, range of motion, ability to transfer, gait mechanics, and cardiovascular endurance.

CHAPTER I

BACKGROUND AND PURPOSE

Guillain-Barre Syndrome is a condition in which the body's immune system attacks its own peripheral nervous system. The body's peripheral nervous system is made up of nerves that are surrounded by a myelin sheath. In Guillain-Barre Syndrome, the body's immune system attacks the myelin sheath and demyelinate the body's nerves. Guillain-Barre Syndrome affects 3000 to 6000 people annually in the United States. It is a rare syndrome as it affects only 1 to 2 per 100 000 people in the United States. The prevalence in men and women is equal.

The most common type of Guillain-Barre Syndrome is also known as acute inflammatory demyelinating polyradiculoneuropathy or AIDP. AIDP is characterized by muscle weakness that starts in the lower extremities and spreads to the upper extremities. Guillain-Barre Syndrome can take days or months to develop. The cause of Guillain-Barre Syndrome is unknown but is thought to occur following an infection such as a viral respiratory or gastrointestinal infection.

The symptoms of Guillain-Barre Syndrome can vary on an individual basis. Common symptoms of the syndrome include muscle weakness, sensory deficits, visual deficits, dysphasia, dysphagia, severe pain, gait and balance deficits, heart rate and blood pressure changes, and bowel and bladder dysfunction. These symptoms can gradually progress or occur almost immediately. These symptoms can progress to near total paralysis to even life-threatening complications.¹

No definitive cause for Guillain-Barre Syndrome has yet been found. However, there is research on diagnostic procedures, intervention procedures, and prognostic factors. There are many prognostic factors that have been found to show a poor prognosis. These prognostic factors include diabetes, hypertension, high body temperature, urinary retention, ventilator support, loss of consciousness, respiratory dysfunction, hyperglycemia, hyponatremia, and high leukocyte count.² The focus of this case will be to describe this patient from the standpoint of a physical therapy (PT) clinician, including examination and intervention techniques of a patient who was admitted into a skilled nursing facility with Guillain-Barre Syndrome who was 4 months past his initial diagnosis. This case is presented to gain a better understanding of Guillain-Barre Syndrome, understand the physiology of the syndrome, and provide a description of the types of interventions used and outcomes seen in this particular case.

CHAPTER II

CASE DESCRIPTION

The patient in this case study is a 64-year-old white male. He was diagnosed with Guillain-Barre Syndrome in May of 2022 and was admitted into a skilled nursing facility in September 2022. Prior to the admission to the skilled nursing facility, he was admitted to a different rehabilitation facility. The patient was a lifetime farmer and made it known his occupation was one of the most important parts of his life. The patient was also family-oriented and used that as motivation throughout his care. He also stated his religion was a motivator for him. He stated his leisure activities included golfing, church, going to social events with his wife, and doing things around the farm. The patient's residence was a two-level house on his farmstead. The patient lived with his wife in their home. He stated his wife is a former certified nursing aid and had experience in healthcare. The patient's house had 3 steps outside to enter the house and one staircase with 10 steps inside the house.

The patient stated his diagnosis occurred via insidious onset and had no signs or symptoms in the months leading up to his diagnosis and admittance into the hospital and then the rehabilitation facility. The patient's comorbidities in this case include generalized anxiety disorder, pure hypercholesterolemia, and mild intermittent asthma. The patient was nonambulatory when he arrived at the skilled nursing facility. The patient was experiencing signs and symptoms of Guillain-Barre Syndrome when he arrived. These included polyneuropathies,

retention of urine, dysphagia, constipation, left wrist contracture, and right wrist contracture. The patient's right foot was in an ankle-foot orthosis (AFO) to aid in dorsiflexion. The patient arrived with a wheelchair and a front wheeled walker that he stated he had used for transfers at the last rehabilitation facility. He stated he had been working on transfers with a physical therapist at his last rehabilitation facility. He also noted his wife, with her experience in healthcare, had been helping him with some of the transfers he had been doing since the onset of his diagnosis.

The patient's number one goal was to return to his home. His other main goal was to walk again. He and his wife had stated this from the first time I saw them. These were long term goals that they stated they needed to accomplish by the end of the time in the skilled nursing facility. The patient also had short term goals. One goal was to be able to slide board transfer from his wheelchair to another surface. Another goal he had was to be able to sit to stand transfer independently. He also stated he wanted to be able to stand independently with his front wheeled walker. Additionally, he had a goal to transfer from sitting to supine independently.

During the patient's initial examination, all systems were reviewed. The patient's heart rate, blood pressure, and respiratory rate were within normal limits. The patient's integumentary system was assessed, noting no significant findings. The patient's bowel and bladder function was being controlled through medication. Additionally, the patient's gastrointestinal system was screened and there were no significant findings.

The patient was determined to be a candidate for physical therapy due to his muscle weakness, nonambulatory status, inability to transfer independently, and diminished muscle endurance. He agreed to have physical therapy twice per day while he was staying in the skilled

nursing facility. During this time, interventions would be selected to address these current activity and participation limitations.

The examination plan my clinical instructor and I chose included manual muscle testing, testing the ability for the patient to transfer, range of motion measurements, and functional endurance testing. It also included patient education throughout the examination. Special tests were not necessary in this case. The patient's rehabilitation potential and prognosis were determined to be fair considering the patient's age, disease progression, patient motivation, and environmental factors.

Examination

The clinical examination for this patient took place in his room in the skilled nursing facility. My clinical instructor, the patient, his wife, and I were all present during the initial examination. The physical therapy examination focused mostly on the patient's lower extremities and transfer ability as he was going to be treated in occupational therapy two times per day for his upper extremities.

The examination started by getting a subjective history from the patient. During this time, the patient explained he had been diagnosed with Guillain-Barre Syndrome about 4 months ago. He had been admitted into a hospital when he started to notice symptoms. Following a one-month hospital stay, he was admitted into a rehabilitation facility in a different city and spent 3 months there. He then was admitted and transferred to the skilled nursing facility of my clinical experience. He stated he was still very weak from the progression of the disease but said he had been making improvements at the last rehabilitation facility he was in. He stated he had a hard

time transferring from his wheelchair to any surface and required assistance from staff or his wife. He also stated he was in moderate pain. He stated pain was greater in the lower extremities than the upper extremities.

The patient was supine when we initiated the clinical examination. Active range of motion measurements were taken on the patient's hips, knees, and ankles. These measurements are appropriate due to the nature of the diagnosed syndrome. One common outcome of Guillain-Barre Syndrome is contracture, so getting baseline range of motion measurements was important. Range of motion measurements were taken at each joint with a goniometer. The motions tested at the hip included bilateral hip flexion, bilateral hip abduction, bilateral hip internal rotation, bilateral hip external rotation, bilateral knee flexion, bilateral knee extension, and bilateral dorsiflexion. Active range of motion measurements are shown in the table below.

Table 1. Initial Range of Motion Measurements		
Hip Flexion	Left: 94 degrees	Right: 102 degrees
Hip Abduction	Left: 18 degrees	Right: 26 degrees
Hip Internal Rotation	Left: 29 degrees	Right: 32 degrees
Hip External Rotation	Left: 26 degrees	Right: 36 degrees
Knee Flexion	Left: 87 degrees	Right: 104 degrees
Knee Extension	Left: lacking 7 degrees	Right: lacking 3 degrees
Ankle Dorsiflexion	Left: lacking 9 degrees	Right: 3 degrees

Following that, manual muscle testing was performed on the patient's hips, knees, and ankles. I performed the manual muscle testing by using my own hands to test the strength of each joint. The motions tested in the hip included bilateral hip flexion, bilateral hip abduction, bilateral internal rotation, and bilateral external rotation. Bilateral knee flexion and extension was also tested. The motions tested in the ankle included bilateral dorsiflexion, bilateral inversion, and bilateral eversion. The patient was unable to do a calf raise so a gross measurement of ankle plantar flexion was also assessed. The patient had weakness in all strength measurements that were tested. Manual muscle testing measurements are shown in the table below.

Table 2. Initial Manual Muscle Test Results		
Hip Flexion	Left: 3/5	Right: 3/5
Hip Abduction	Left: 2/5	Right: 2/5
Hip Internal Rotation	Left: 3/5	Right: 3/5
Hip External Rotation	Left: 3/5	Right: 3/5
Knee Flexion	Left: 3/5	Right: 3/5
Knee Extension	Left: 3/5	Right: 3/5
Ankle Dorsiflexion	Left: 1/5	Right: 3/5

Goniometric measurements are standard practice used by physical therapists to assess joint range of motion. In a study conducted by Jones et al,³ it was concluded that goniometer use has a 95% confidence interval. Physical therapists also use manual muscle testing to test strength in different joints of the body. The specificity and sensitivity of manual muscle testing was

studied by the Shirley Ryan ability lab.⁴ Sensitivity was measured to be 0.35, and specificity was measured to be 0.90.⁴

Following the clinical examination my clinical instructor and I discussed the ICF model and how it applies to this case. The model was filled out as seen below:

Health Condition: Guillain-Barre syndrome.

Body Function: decreased strength, decreased gait, increased pain, decreased range of motion, nonambulatory, and decreased balance/proprioception.

Body Structure: drop foot on right lower extremity and lower extremity muscle weakness.

Activity Limitations: unable to ambulate, requires assistance with dressing, unable to transfer independently, and unable to drive.

Participation Restrictions: unable to work on farm, unable to attend church services, and unable to live at home with his wife.

Environmental Factors: use of AFO, familial support via wife who lives in the area, and staff available in current living situation to assist.

Personal Factors: advanced age (64 years), motivated to improve, anxiety, depression, male, active and independent in all daily activities prior to diagnosis.

Evaluation, Diagnosis, Prognosis

Following the clinical examination of this patient, the evaluation process started. A problem list was created. The problem list can be seen below.

1. Increased pain in lower extremities
2. Nonambulatory status
3. Unable to transfer independently
4. Impaired strength
5. Impaired range of motion
6. Decreased functional capacity

The underlying cause of each problem is the patient's diagnosis of Guillain-Barre Syndrome and the signs and symptoms associated with the condition. At the time of evaluation, the patient was medically stable and his body healing. This gave us an opportunity to improve the limitations and restrictions he was currently experiencing. The ICD-10 code for Guillain-Barre syndrome is G61.0.⁵

We also evaluated goals for the patient. Long-term goals and short-term goals were set following his examination. These goals were to be reassessed every 8 visits.

Short-term Goals (To be met in 4 weeks)

1. Following PT intervention, the patient will increase bilateral dorsiflexion active range of motion to 10 degrees in order to increase efficiency with transfers and gait.
2. Following PT intervention, increase strength in all tested lower extremity planes to at least 4/5 MMT in order to increase efficiency with transfers and increase functional capacity.

3. Following PT intervention, patient will demonstrate decreased pain levels to 2/10 or lower on the visual analog scale in order to improve duration of PT sessions and sleeping tolerance.
4. Following PT intervention, the patient will be able to perform a slide board transfer independently so he can be independent in his room.
5. Following PT intervention, the patient will be able to ambulate 250 feet using the LiteGait (Jackson, MS) to increase efficiency in his gait.

Long-term Goals (To be met in 10 to 12 weeks)

1. Following PT intervention, the patient will be able to return home and continue with outpatient physical therapy.
2. Following PT intervention, the patient will ambulate 500 feet or greater using the LiteGait in order to improve his aerobic endurance.
3. Following PT intervention, the patient will be able to sit to stand transfer independently in order to be able to perform standing activities independently.

CHAPTER III

INTERVENTIONS

The patient in this case study had physical therapy sessions twice a day for three months in our facility. The physical therapy staff and I performed and prescribed many different interventions throughout his treatment sessions. Interventions were performed in supine, sitting, and standing. Initially, the patient was unable to bear weight independently, so interventions were performed in supine or sitting. One of the first supine interventions that was initiated was a quadriceps set. The patient lay in supine and contracted his quadriceps muscles and attempted to fully straighten his knees into terminal knee extension. This intervention was performed to activate and strengthen the patient's quadriceps muscles. The next intervention performed was known as hamstring sets. The patient dug his heels into the bed, facilitating muscle activity in the hamstrings. Another intervention was a short arc quadricep extension. The physical therapist and I put a pillow under the patient's knees and the patient raised his leg and foot up to reach terminal knee extension. This was done against gravity to strengthen the patient's quadriceps muscles. The next intervention was hip abduction. The patient moved his leg out to the side while keeping it straight in order to complete the abduction movement. This intervention activated the patient's gluteus medius and minimus muscles. The patient also performed a straight leg raise into flexion. This was done against gravity in order to strengthen the patient's quadriceps muscles. Another supine intervention was heel slides into knee flexion. This

intervention was used to improve the patient's knee flexion active range of motion. The patient flexed his knee and held it into flexion, with overpressure provided by the PT and me. The patient tolerated these initial exercises well and stated he had been doing some of them at the last facility he was in.

Symptoms of the patient's diagnosed condition included contractures and tight muscles. Passive stretching was also performed by the PT and me. We stretched the patient's hamstrings, ankle dorsiflexors, hip internal and external rotators, and hip flexors. The patient tolerated these stretching interventions well.

Seated interventions were also performed initially while the patient was seated in a wheelchair. One of the seated interventions that was performed was a long arc quadriceps extension. This was performed by the patient activating his quadriceps muscles to straighten his knee into terminal knee extension. The patient also performed seated hip flexion against gravity to strengthen his hip flexors. He also performed seated hamstring curls with Theraband, (Akron, Ohio) wrapped around the posterior ankle. The patient flexed his knee against the Theraband resistance in order to strengthen his hamstrings. He also performed seated hip abduction with Theraband and PT overpressure resistance. Seated hip adduction was also performed against PT overpressure to strengthen the patient's hip adductors.

As the patient got stronger, transfer training was initiated. The patient completed sit to stand transfers with PT assistance varying from moderate to minimal. This was done with a gait belt placed on the patient and the PT and I provided assistance from the gait belt. Transfer training with a slide board was also initiated. During this intervention, a slide board was placed underneath the patient's buttocks and lined up, so it lay on another sitting surface. The patient

was wearing a gait belt during this intervention as well. The patient utilized his upper extremities to slide his lower extremities across the board and onto the other sitting surface. PT assistance was provided at the gait belt.

Another intervention that was used was ambulation in a LiteGait. A LiteGait is an apparatus that is used to control the amount of weight a patient bears while ambulating. This intervention was used so that the patient could relearn gait mechanics without having to bear full weight on his lower extremities.

The physical therapist and I used harnesses to secure the patient into the LiteGait. We were able to drive the LiteGait and control it while the patient ambulated throughout the facility. The LiteGait intervention was used once per day for distances that the patient could tolerate. Cues were given to the patient for heel-toe gait pattern, gait speed, and use of reciprocal arm motion. Use of body weight supported gait training was studied by Sousa et al.⁶ They concluded that the use of body weight support is effective and allows the physical therapist to watch and correct gait patterns without the need to provide physical assistance. Another article by Brown et al,⁷ showed that body weight support gait training showed the same effectiveness for step width as conventional gait training on the ground only.

An article by Davidson et al,⁸ studied the prevalence and effectiveness of physical therapy rehabilitation services following a diagnosis of Guillain-Barre syndrome. Over 1500 patients diagnosed with Guillain-Barre syndrome were surveyed about postdiagnosis rehabilitation services. The study concluded that overall, there was substantial improvement in physical functioning of patients following their diagnosis. It also stated that fatigue was a prevalent factor in these patients' lives. The study found that positive outcomes need to address fatigue levels

when treating patients with this diagnosis. Another conclusion from the study is that changes in procedure and policy should be introduced in order for patients to receive inpatient rehabilitation services following a diagnosis of Guillain-Barre syndrome.

CHAPTER IV

OUTCOMES

I was not able to perform the discharge for the patient in this case, as my clinical experience ended before the patient was appropriate for discharge. However, patient outcomes were visible throughout the course of this patient's rehabilitation sessions. The patient was nonambulatory, not able to transfer sit to stand independently, not able to slide board transfer independently, and had significant muscle weakness when he first arrived. At the end of my clinical rotation, the patient was transferring independently using a slide board. He also was able to transfer sit to stand independently with significant use of his upper extremities. The patient also demonstrated improved lower extremity muscle strength. This was shown by his ability to transfer, the ability to progress lower extremity strengthening activities, and his ability to ambulate in the LiteGait.

These outcomes satisfied more than one level of the patient's disablement levels. The patient was now able to transfer independently which allowed him to participate in more activities in his daily life. This addressed the patient's participation restrictions. It also satisfied his activity limitations as he was more active throughout the facility. It also satisfied his body function level of disablement as he improved his strength and range of motion. He also decreased his overall pain levels. The patient showed this progress over the course of my time at the facility.

The patient showed good compliance to the treatment sessions over the course of his rehabilitation. He was motivated and worked hard during each session. He also expressed

interest in getting a home exercise program for interventions he could do independently in his room over the weekends, as he was not seen in therapy those days. He was also educated on bed positioning to reduce the risk of pressure sores during the weekends. The CI I was working with emailed me and stated he had been discharged from the transitional care unit and was continuing to work with him in outpatient physical therapy.

CHAPTER V

DISCUSSION

The patient was nonambulatory, weak, and had decreased tolerance to activity when he first arrived at the facility where I was doing my clinical experience. Over the course of my time working with him, he improved his strength, range of motion, transfer ability, weight bearing tolerance, and functional capacity. The purpose of the case report was to describe the patient at his initial evaluation, track his progress over the course of my time at the facility, and track his outcomes at the end of my time there. The patient significantly improved over the course of his rehabilitation stay.

The patient's initial evaluation identified restrictions that we chose to work on during his physical therapy treatment sessions. The initial evaluation was thorough and identified muscle weakness, range of motion limitations, inability to independently transfer, decreased tolerance to activity, and decreased functional capacity. Interventions were selected based on the findings during the initial examination.

There is evidence the patient improved over the course of my clinical experience as a result of the interventions my CI and I implemented, his motivation and work ethic, and his body healing from his medical condition. Interventions were selected to increase his lower extremity strength which did improve over time. Transfer training was selected as an intervention, and at the end of my clinical experience the patient was able to slide board transfer independently and

sit to stand with only contact guard assistance. Passive range of motion and stretching were selected in order to improve range of motion in the patient's lower extremities. Lower extremity range of motion improved at the end of my clinical experience. The patient had physical therapy services twice a day on weekdays and had a home exercise program to perform on weekends. I believe this intense duration of physical therapy services led to improvement in the patient's overall function.

Reflective Practice

I believe this case study could have been more thorough if the initial examination occurred closer to the patient's medical diagnosis of Guillain-Barre Syndrome. A limitation of this case report is the shortened period of time I worked with the patient. I believe I would have had a more thorough case study if I was able to perform the initial examination when the patient first started physical therapy following his diagnosis of Guillain-Barre Syndrome. I believe the patient will continue to progress and gain function as he continues with outpatient physical therapy.

The patient was seen twice a day for five days, each session lasting approximately 45 minutes. Each session was billed as therapeutic exercise, therapeutic activities, gait training, or a combination of both. The CPT code for therapeutic exercise is 97110. The CPT code for therapeutic activities is 97530. The CPT code for gait training is 97116. In the four weeks I worked with the patient, the patient totaled 40 visits. The patient's deductible had been met and his rehab stay in the transitional care unit was being covered by his insurance. The patient was not expected to pay any out-of-pocket cost from my understanding.

The theoretical cost/benefit ratio is a high amount of cost for the amount of therapy he will need in order to return to his work. The patient had a multiple month stay in the rehabilitation facility and then progressed to outpatient physical therapy. The services were necessary for the patient to regain function and to help progress to his baseline prior to being diagnosed with Guillain-Barre syndrome.

REFERENCES

1. van Doorn PA, Ruts L, Jacobs BC. Clinical features, pathogenesis, and treatment of Guillain-Barré syndrome. *Lancet Neurol.* 2008;7(10):939-950. doi:10.1016/s1474-4422(08)70215-1
2. Zhang Y, Zhao Y, Wang Y. Prognostic factors of Guillain-Barré Syndrome: a 111-case retrospective review. *Chin Neurosurg J.* 2018;4(1). Doi:10.1186/s41016-018-0122-y
3. Jones A, Sealey R, Crowe M, Gordon S. Concurrent validity and reliability of the simple goniometer iphone app compared with the Universal Goniometer. *Physiother Theory Prac.* 2014;30(7):512-516. doi:10.3109/09593985.2014.900835
4. Manual Muscle Test. Shirley Ryan AbilityLab. <https://www.sralab.org/rehabilitation-measures/manual-muscle-test>.
5. Rehab Q. ICD 10 & ICD 9 codes for Guillain Barré syndrome: Quantum rehab®. Quantum. <https://www.quantumrehab.com/quantum-rehab-clinicians/icd-10-codes-guillian-barre-syndrome.asp>.
6. Sousa CO, Barela JA, Prado-Medeiros CL, Salvini TF, Barela AMF. The use of body weight support on ground level: An alternative strategy for gait training of individuals with stroke. *JNER.* 2009;6(1). doi:10.1186/1743-0003-6-43
7. Brown TH, Mount J, Rouland BL, Kautz KA, Barnes RM, Kim J. Body weight-supported treadmill training versus conventional gait training for people with chronic traumatic brain injury. *J Head Trauma Rehabil.* 2005;20(5):402-415. doi:10.1097/00001199-200509000-00002
8. Davidson I, Wilson C, Walton T, Brissenden S. Physiotherapy and Guillain–Barré Syndrome: results of a national survey. *J Physiother.* 2009;95(3):157-163. doi:10.1016/j.physio.2009.04.001