Physical Therapy Treatment for a Patient with a Hip Fracture and Cognitive Impairments: A Case Report

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Physical Therapy Treatment For A Patient With A Hip Fracture And Cognitive Impairments: A Case Report

By

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Doctor of Physical Therapy
November 28, 2018

A Scholarly Project Submitted to the Graduate Faculty of the
Department of Physical Therapy
School of Medicine
University of North Dakota

In partial fulfillment of the requirements for the degree of
Doctor of Physical Therapy
Grand Forks, North Dakota
May 2019
**Abstract**

- The patient in this case report was a 78 year-old female who sustained a femoral neck fracture after a fall. The fracture was repaired surgically with a hip hemiarthroplasty procedure. The patient received physical therapy interventions over the course of seven weeks at a transitional care unit.
- Physical therapy interventions for this patient included:
  - Gait Training
  - Patient Education
  - Transfer Training
  - Strengthening Exercise
  - Balance Activities
- The patient had comorbidities that increased her risk of falling such as osteoporosis, history of falls, and cognitive impairment. Cognitive impairment can affect the quality of care, patient rapport, and treatment plan. Physical therapy interventions were modified for this patient using frequent tactile cueing during exercise. This ensured proper form and function if instructed properly. There was a lack of research on the most effective and efficient way to treat and teach a patient with cognitive impairment in physical therapy.

**Literature Review**

There is an abundance of literature regarding hip fractures and falls as they are some of the most common injuries in older adults. There is also information on dementia and cognitive impairment. A study by Heny et al. was key in proving that patients with cognitive impairments can regain strength and function if instructed properly. There was a lack of research on the most effective and efficient way to treat and teach a patient with cognitive impairment in physical therapy.

**Problem Statement**

This patient faced many issues with rehabilitation following her procedure including pain, instability, weakness, decreased function, and decreased independence with gait and transfers. All of these problems were accentuated by cognitive impairment. The affected her ability to follow the home exercise program and use a front-wheeled walker appropriately.

**Methodology**

The interventions for this patient were created by a student physical therapist and a licensed physical therapist supervisor. The patient’s progress was monitored and re-evaluated every two weeks. Tactile cueing was the main difference during treatments compared to a patient with similar physical dysfunctions without cognitive impairments.

**Results**

- Tables 3 and 4 show the results of pre and post tests and measures after seven weeks of physical therapy interventions.
- The patient was able to complete activities of daily living independently.
- She continued to require the use of a front-wheeled walker at the time of discharge.
- The patient was able to decrease her pain levels both at rest and during weight-bearing activities.
- She reduced her Timed Up and Go Test score time from 27 seconds to 23 seconds.
- The patient was able to ascend 4 steps with the use of a railing.
- She was able to complete her home exercise program at the time of discharge with verbal cueing and a handout for reference.

**Discussion/Conclusions**

- The patient in this case study showed positive results from physical therapy intervention, but different methods of treating patients with cognitive impairments should be studied.
- All patients with cognitive impairments do not have the same symptoms. Therefore, physical therapy treatment will vary based on individual presentation.
- Tactile cueing may be a useful tool when working with patients with cognitive impairments, learning disabilities, vision and/or hearing issues.

**Limitations**

- The case study only involved one patient.
- No control group was used to compare results.
- No follow up after patient was discharged.

**References**

This Scholarly Project, submitted by Tracie Boehmlehner 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.

[Signatures]

(Graduate School Advisor)

(Chairperson, Physical Therapy)
PERMISSION

Title Physical Therapy Treatment For A Patient With Hip Fracture And Cognitive Impairment: A Case Report

Department Physical Therapy

Degree Doctor of Physical Therapy

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Date 12-13-18
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ABSTRACT

Background and Purpose: As the population shifts to include higher numbers of people in the elderly population, diseases and pathologies associated with geriatric populations will also increase. Two of these conditions are cognitive impairment and hip fractures. Hip fractures can be costly and life altering injuries. Treating patients with both of these conditions can pose a unique challenge to healthcare workers. Case Description: The patient in this case study is a 78 year-old female who suffered a hip fracture secondary to a fall with a hip hemiarthroplasty completed. She had many co-morbidities that are typical of an aging person such as osteoporosis and cognitive impairment. Interventions: The patient participated in physical therapy interventions in a transitional care unit over the course of seven weeks. These interventions included patient education, strengthening, balance exercises, transfer training, and gait training. Due to her cognitive impairment, the patient’s learning style differed from other patients with hip fractures. The use of tactile cueing proved to be a key component in treating her orthopedic condition. Outcomes: The patient was able to meet all of her goals set at the initial evaluation. She regained strength and balance in order to be functionally independent with transfers, gait, and ADLs, and she was able to return to her home in a memory care unit. Discussion: This case study demonstrated one successful method of treating a patient with a hip fracture and cognitive impairments. Each patient with these conditions may present differently and require a more specialized plan of care in order to get the desired outcomes.
CHAPTER I
BACKGROUND AND PURPOSE

According to the Center for Disease Control, one out of every four adults over the age of 65 will experience a fall this year.\(^1\) Falling can result in a variety of injuries, but the most common types of injuries associated with falls are hip fractures and traumatic brain injuries. In fact, over 800,000 patients are hospitalized each year because of injuries sustained from a fall.\(^1\) Injuries resulting from falls, hospital stays, and emergency room visits can add up to a costly bill. In 2015, the United States spent $15 billion dollars on treatments after falls with Medicare and Medicaid covering 75% of the total cost.\(^1\)

The major risk factors for falling include weakness, poor balance, poor vision, foot pain, use of certain medications, and unsafe living environments.\(^1\) Fortunately, healthcare professionals such as physical therapists have developed methods of treating, preventing, and screening for falls. Balance and strength assessments and home evaluations are some of the tools physical therapists may use to screen patients and determine their risk of falling. Many different balance assessments are performed in therapy, depending on the patient’s presentation. Some of the most common balance assessments are the Berg Balance Scale, Tinetti, BesTest, and Dynamic Gait Index. These assessments were developed to determine the level of fall risk but are not always completely accurate. Therefore, it may be possible to reduce the number of falls, but it is not possible to prevent falls entirely.

As mentioned previously, femoral neck or hip fractures are frequent outcomes following a fall. These injuries are typically treated with a surgical hemiarthroplasty procedure and
physical therapy interventions. Hip hemiarthroplasty surgeries have become routine procedures performed immediately after a hip fracture. A surgeon will replace the femoral head and part of the femoral shaft with metal. However, in this procedure, the acetabulum is not surgically repaired or replaced. This differs from a traditional total hip arthroplasty where both the femur and acetabulum are replaced with artificial components. Without any surgical repair/replacement of hip fracture, patients have a 249% increased risk of mortality within one year.²

Even with surgical repair, patients continue to have an increased risk of mortality. Following hip fracture in patients who are 65 or older, males have a 37.1% and females have a 26.4% increased risk of mortality.³ Hip fractures can become fatal for numerous reasons. One of the major causes of death associated with hip fractures is pneumonia. A person may become debilitated and remain in bed due to weakness and pain following a hip fracture. This leads to complications in other organ systems and eventually may be fatal. It is also common for patients who do survive one year after a hip fracture to not return to their prior level of function. An average hip fracture will cost $29,445.75 after one year of medical treatment.⁴ This cost includes emergency care, surgery, post-operative hospital care, and therapy services. Overall, hip fractures can be detrimental to a patient’s independence, functional ability, quality of life, and finances.

Cognitive impairment is a major risk factor when predicting falls leading to hip fractures. Patients with cognitive impairments are three times more likely to sustain a hip fracture compared to patients with normal cognition.⁵ This increased risk of falling could be due to a number of factors such as reduced physical activity, a cluttered environment, reduced awareness of surroundings, and poor judgement or decision making. Research has shown that women with
cognitive impairments demonstrate increased postural sway when standing statically compared to women of similar age and strength without cognitive deficits. Cognition also has an effect on dual-task ambulation. People with mild cognitive impairments showed a significant decrease in gait speed and stability when asked to perform verbal tasks and walk simultaneously when compared to people with normal cognition.

Various methods of assessing cognitive impairment are utilized in healthcare today. One of the most prevalent assessment tools for assessing cognition is the Mini Mental State Exam (MMSE). The MMSE has a maximum score of 30 which corresponds with no cognitive impairments. The MMSE is a questionnaire involving word recognition, mathematical problems, verbal communication, drawing, and orientation to time and place. According to the MMSE, scores that fall between 20-24 indicate mild impairment, 13-19 is moderate impairment, and under 12 is severe cognitive impairment.

Rehabilitation and physical therapy for patients with a femoral neck fracture are necessary to regain independence levels and return to prior living environment. Unfortunately, patients with dementia can often suffer from limited care and rehabilitation opportunities. According to Sietz, 40% of patients with dementia do not receive any rehabilitation process after a hip fracture. Forgoing physical therapy leads to an increased risk of moving to a long-term care facility and losing independence. Research has also shown that patients with cognitive impairments are able to restore more function while receiving therapy at an inpatient setting.

Conventional physical therapy treatment for post-op hip hemiarthroplasty patients can include a variety of interventions including but not limited to stretching, strengthening, gait and transfer training, neuromuscular reeducation, and patient education. Abundant literature has been published reviewing the effectiveness of these interventions for patients with hip fractures and
hemiarthroplasty repairs. However, most of these studies are focused on patients with normal cognition. A study by Heyn\textsuperscript{10} confirms it is possible for patients with cognitive impairments to achieve similar levels of endurance and strength as cognitively intact patients. Patients with dementia are able to safely exercise at an intensity level similar to their peers without cognitive impairments\textsuperscript{11}. However, there is a lack of research regarding the best intervention plan for patients with this comorbidity. Cognitive impairments can decrease a patient’s ability to learn and retain new information. This can have serious implications on the safety and effectiveness of many physical therapy interventions.

Learning styles may also be affected by cognition. While verbal, visual and auditory teaching techniques are effective in some patients, tactile cueing may be more valuable for patients with cognitive impairments.\textsuperscript{12} Tactile cueing provides hands-on feedback to the patient during strengthening exercises. This can ensure the exercises are performed with proper technique and speed.

The purpose of this case report is to determine the effectiveness of physical therapy interventions using tactile cueing for a patient with moderate cognitive impairment following a fall with a hip fracture and hemiarthroplasty.
CHAPTER II

CASE DESCRIPTION

The patient was a retired 78-year-old female with a left femoral neck fracture. The fracture was a result of a fall in her home at a memory care unit. She was unable to provide an accurate description of the incident leading to the fall. After a medical chart review, it was determined the fall occurred in her room during the night. The patient was unable to recall any previous falls or past medical history due to her cognitive impairment. An extensive medical chart review indicated the patient had a history of frequent falls since moving to the memory care unit and other diagnoses of osteoporosis and cognitive impairment. No additional injuries or health conditions were reported by patient or discovered in medical charts. The patient reported she was independent with all ADLs (activities of daily living) besides cooking and driving and did not use an assistive device prior to her injury. The patient’s primary complaint was constant 8/10 pain on the visual analog scale (0 being no pain and 10 being worst possible pain) in her left anterior hip.

Surgical intervention of her left hip fracture with a hemiarthroplasty procedure was completed within 24-hours of her initial injury. The patient received physical therapy in an acute care setting for three days following surgery. Physical therapy interventions in acute care included transfer training, patient education, and non-weight bearing exercises. Physical therapy notes indicated that the patient was not compliant with therapy and refused most treatment sessions. The patient was transferred to a transitional care unit (TCU) four days after her surgery with referral for physical therapy following discharge from hospital. The patient was under
standard hip precautions for six weeks post-surgery. These precautions included no hip flexion greater than 90 degrees, no hip internal rotation, no hip adduction, and weight bearing as tolerated.

Upon initial evaluation at TCU four days post-op, the patient showed significant impairments in mobility, strength, range of motion (ROM), and lacked independence with ADLs. Lower extremity strength was assessed and graded using manual muscle testing (MMT) and ROM was measured actively with a goniometer. The patient’s initial strength and ROM values are included in Table 1. Strength and ROM measurements were limited by increased pain at her left hip.

<table>
<thead>
<tr>
<th>MMT Strength Scores</th>
<th>R Lower Extremity</th>
<th>L Lower Extremity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip Flexion</td>
<td>4/5</td>
<td>2+/5</td>
</tr>
<tr>
<td>Knee Extension</td>
<td>4+/5</td>
<td>3+/5</td>
</tr>
<tr>
<td>Knee Flexion</td>
<td>4/5</td>
<td>3+/5</td>
</tr>
<tr>
<td>Ankle Dorsiflexion</td>
<td>4+/5</td>
<td>4/5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AROM Measurements</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip Flexion</td>
<td>94 degrees</td>
<td>59 degrees</td>
</tr>
<tr>
<td>Hip Abduction</td>
<td>26 degrees</td>
<td>10 degrees</td>
</tr>
</tbody>
</table>

The patient’s functional mobility and transfers were assessed bedside in her TCU room. The results of the patient’s functional mobility at the initial evaluation are reported in Table 2. She was able to assist during transfers but required detailed explanation of transfers prior to attempting. She was hesitant of falling or attempting transfers without significant assistance. She claimed moving was painful and stated she felt too weak. The patient was unable to weight-bear during the initial evaluation due to pain. Therefore, ambulation and standing balance were not assessed at that time. She was able to statically sit at the edge of her bed and in a chair independently and safely.
Table 2.
Initial Evaluation Functional Mobility Assessment

<table>
<thead>
<tr>
<th>Movement</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supine to Sit</td>
<td>MAX 1</td>
</tr>
<tr>
<td>Sit to Supine</td>
<td>MAX 1</td>
</tr>
<tr>
<td>Sit to Stand</td>
<td>MAX 1</td>
</tr>
<tr>
<td>Stand Pivot</td>
<td>MAX 1</td>
</tr>
<tr>
<td>Ambulation</td>
<td>Unable to attempt due to pain</td>
</tr>
<tr>
<td>Sitting Balance (static)</td>
<td>Independent and Safe</td>
</tr>
</tbody>
</table>

The patient stated she had little family support after the passing of her husband and two of her children were living out of state. She did have one son living within one hour of the TCU facility, but she was unable to recall what city he lived in. No family members were present during the initial evaluation or any subsequent treatment sessions.

A systems review was conducted at the time of initial evaluation. The patient’s cardiopulmonary system was evaluated and determined to be within functional limits with her resting pulse rate at 88 beats per minute, O2 SAT’s at 92% on room air, and blood pressure at 124/82. The surgical site and integumentary system were evaluated and displayed no signs of infection and her staples were intact. Patient completed a Mini-Mental State Exam (MMSE) at the time of admission to TCU and scored 13/30, showing moderate cognitive impairments. The patient was unable to determine the date, count backwards, or recall three words. She was able to determine her general location, follow directions, create a coherent sentence, and draw a picture. She was not fully cooperative during the MMSE and disliked being asked questions.

The patient’s symptoms and limitations were consistent with the diagnosis of recent hip fracture and hemiarthroplasty. Therefore, additional special tests were deemed unnecessary during her initial evaluation. Her fall may have been influenced by weakness, balance deficits, and cognitive impairment even though specific balance testing was not able to be evaluated during the initial evaluation. The patient demonstrated a clear need for physical therapy.
intervention to improve her mobility and reduce the risk of subsequent injuries. Due to the discrepancy between her prior and current levels of physical function, the patient was considered appropriate for therapy in the TCU setting.

The prognosis for patients following hip fractures can be determined by several risk factors. A study by Kristensen\textsuperscript{13} reviewed these possible risk factors and their affect on patient prognosis. The study results showed males, older age, poor health, low prior level of function, low cognitive status, inter or subtrochanteric fracture, high level of pain, anemia, immobilization, muscle strength, and fear of falling resulted in worse functional and mortality outcomes. The patient in this case study had the risk factors of older age, low cognitive status, high levels of pain, and low muscle strength. The prognosis for the patient was fair due to decreased cognitive level with a MMSE score of 13/30. Patients with cognitive impairments may require alterations to the typical plan of care for patients with hip hemiarthroplasty procedures. These alterations may include frequent visual, verbal, and tactile cuing, shorter duration of therapy sessions, more repetitions, slower progression of exercises, and more assistance with gait and transfers.

Following the initial examination and evaluation, a plan of care was established by the physical therapist supervisor and student physical therapist. The patient was scheduled for 60 minutes of physical therapy per day divided into two 30-minute sessions, five days per week. A physical therapist supervisor, student physical therapist, and/or physical therapy assistant managed therapy sessions. Re-evaluations were performed by a physical therapist after every ten treatment days. PT interventions included strengthening, balance training, gait training, transfers, and patient education which will be described in greater detail in Chapter Three. The patient also received Occupational Therapy during this time for upper extremity strengthening, ADL training, and use of adaptive equipment.
The physical therapy goals for this patient were 1) to become independent in all transfers, 2) to ambulate 300 feet with use of appropriate assistive device, 3) increase MMT strength to at least 4/5 for all lower extremity movements, 4) be able to demonstrate home exercise program with assistance due to cognition, and 5) be able to recall hip precautions with all goals to be met within 6 weeks. The patient would be discharged to her home in a memory care unit when all goals were met. The memory care unit in which she resided required all residents to be fully independent with transfers, so it was imperative to meet this goal before being discharged. The patient stated her goals were to go back to her home in the memory care unit and to be in less pain. She agreed with the goals set by the physical therapist and the overall plan of care.
CHAPTER III

INTERVENTIONS

The patient participated in Physical Therapy at a transitional care unit five days per week for a total of seven weeks. Therapy sessions included two 30-minute sessions daily. In addition to Physical Therapy, the patient participated in Occupational Therapy daily. Traditional Physical Therapy interventions following a femoral neck fracture with hip hemiarthroplasty often include strengthening, balance, gait training, and patient education. It has been assumed that endurance and strength training in people with cognitive impairment may not be as effective as patients with intact cognition. According to a meta-analysis by Heyn\textsuperscript{10}, patients with cognitive impairment equal to or greater than 25/30 on MMSE are able to improve strength and endurance at a similar rate compared to their cognitively intact peers. Due to the patient’s MMSE score of 13/30, exercises required modifications to be optimally effective. Exercises for this patient focused on strengthening bilateral lower extremities. The first week of exercises were performed primarily in sitting and supine positions due to pain while weight bearing. These exercises included supine isometric contractions of glutes, hamstrings, and quadriceps as well as straight leg raises, heel slides, ankle pumps, and sliding hip abduction. Sitting exercises for this patient included isometric hip abduction and adduction, long arc quadriceps extension, and knee flexion with use of a yellow resistance theraband. Initially these exercises were performed for three sets of eight repetitions without additional weight. The patient required rest breaks after every three exercise sets. These rest breaks would last thirty seconds. As the patient progressed, exercises were adjusted by including additional sets and repetitions followed by applying ankle weights or...
increasing resistance theraband strength. After two weeks of Physical Therapy intervention, the patient increased the amount of exercise to three sets of ten repetitions of each lower extremity exercise with fewer rest breaks. By the fourth week of Physical Therapy treatment, the patient was able to perform these exercises with one-pound ankle weights for straight leg raises, supine hip abduction, and long arc quadriceps extension. The intensity for knee flexion and seated bilateral hip abduction was increased at this time by using the green resistance band instead of the yellow resistance band. By the final week of Physical Therapy, the patient was able to complete three sets of twelve repetitions for all supine and sitting lower extremity exercises using one-and-a-half-pound weights on ankles and red resistance theraband.

Verbal cueing for these exercises was not effective as the patient’s attention was easily diverted. This resulted in poor performance of exercises and delayed improvement of strength and endurance. Tactile cueing had much better results. The therapist gently placed hands on the patient’s lower extremity to guide the exercise and ensure proper form. This enabled the patient to complete the exercise program in a time efficient manner and increase lower extremity strength and endurance.

Gait training was another intervention that was initiated two days after the initial evaluation of this patient. The patient began by weight shifting laterally and with staggered stance front to back in the parallel bars. During week two, the patient began forward stepping in the parallel bars. The physical therapist provided verbal cues to begin with a step to gait pattern with bilateral upper extremity support on the parallel bars, gait belt, and contact guard assist. The patient was also fitted for a front-wheeled walker and instructed on proper step sequence. The use of the front-wheeled walker was limited to stand pivot transfers during the first week. After the patient began to feel more confident in the parallel bars, she progressed to gait training with
the front-wheeled walker. Visual and verbal cueing was frequently used to promote proper use of the assistive device as the patient would often push the front-wheeled too far in front of her body and increase trunk flexion. Gait training with the assistive device in the correct position and distance from her body aided in the normalization of the patient’s gait pattern. Patients with abnormal gait pattern, including an antalgic gait pattern, are at an increased risk of falling.\textsuperscript{14} Decreased stride length and stance phase time are major risk factors for falls. During the final week of Physical Therapy, the patient was able to ambulate short distances of less than fifteen feet without an assistive device and using handhold assist only. However, without the use of the assistive device, the patient showed decreased step length and cadence as well as an increased antalgic gait pattern and fear of falling. Therefore, the patient continued to use a front-wheeled walker even after discharge from the TCU.

The patient’s progress in gait speed and independence was monitored by performing a Timed Up and Go Test (TUG) every two weeks. The TUG is commonly used to measure dynamic gait and balance. This assessment is conducted by having the patient transfer from a sitting position, ambulating 10 feet around a cone on the floor, and return to original seated position. The TUG has been specifically used to determine risk of falling for patients following hip hemiarthroplasty procedures. Patients able to perform the TUG in under 24 seconds have been shown to have a reduced risk of falling.\textsuperscript{13}

As the patient progressed and was able to tolerate weight-bearing activities, standing exercises were incorporated into her exercise routine. These exercises were performed in the parallel bars with a gait belt and contact guard supervision from the physical therapist. Exercises included lateral stepping, partial squats, marches, heel raises, hip abduction, hip extension, and step-ups using a four-inch step. The patient began by completing each exercise for one set of
eight repetitions in combination with the seated and supine exercises described above. At this
time, the patient required frequent sitting rest breaks. Seated exercises were often performed
during this time. By week four of Physical Therapy intervention, the patient was able to do two
sets of eight repetitions but still required a few rest breaks. She progressed during weeks five and
six and was able to complete three sets of ten with multiple rest breaks. As the patient’s
endurance improved during the last three weeks, she required fewer and shorter rest breaks.
During the final week of therapy, the patient was able to increase to three sets of ten repetitions
of all standing exercises with good form and only required one rest break.

Verbal cueing was again unsuccessful and tactile cueing in a standing position was
difficult to perform. The patient performed best with visual demonstrations throughout the
duration of the exercise session. A physical therapist assistant was responsible for assisting the
patient for safety reasons as the lead therapist would demonstrate the exercises and provide
instructions as needed.

Balance training was another essential Physical Therapy intervention for this patient.
Balance training activities are often associated with decreased risk of falling as well as building
confidence to participate in ADLs and recreational activities. This can greatly improve the
patient’s quality of life. Balance training for this patient was not conducted during the first two
weeks of therapy due to painful weight bearing. The balance training program was based on the
interventions used in an study by Madureira. This study showed a significant increase in Berg
Balance Scale scores among women with osteoporosis. The increase of Berg Balance Scale
scores is correlated with a decreased risk of falling. The balance interventions for the patient
were performed in the parallel bars with a gait belt for safety. The specific exercises included
tandem walking, standing on foam surfaces, standing with eyes closed, and stepping over and
around objects placed on the floor of the parallel bars. The patient began balance exercises during the third week. She started by performing static balance activities of standing on foam, partial tandem stance, and standing with her eyes closed. These exercises were performed three times with a ten second hold for each. The patient progressed during week four to tandem walking and stepping over objects. These interventions were also performed in the parallel bars. The patient would complete these training activities three times as well. The patient would complete 180 degree turns taking multiple small steps at the end of the parallel bars each time. The patient often required sitting rest breaks between exercises until her endurance improved. During week five, the patient increased the number of repetitions to four for each balance activity. On the final two weeks of Physical Therapy, she was able to complete five repetitions of each. A standing balloon tap exercise and bean bag toss were also incorporated into the treatment session at this time and were performed one minute at a time for 3 sets of each with seated rest breaks between sets. These exercises were designed to imitate situations and environments the patient may encounter after discharging from the TCU.

PT interventions were conducted and adjusted throughout the course of her stay at the TCU. One week prior to her expected discharge, the patient was provided with a home exercise program handout. This included pictures and written descriptions of each exercise. The home exercise program included standing hip abduction, marches, partial squats, and hip extension. These exercises were to be performed for three sets of ten repetitions at least once daily. The instructions stated the patient should complete exercises while holding on to her kitchen counter for safety reasons. These exercises were practiced every day at the kitchen sink in the therapy room during her last week of therapy. The final therapy session included a re-evaluation of strength, balance, gait, ROM, and functional abilities which were included on her discharge
summary. Her outcomes are outlined in Chapter IV. After the final interventions were conducted, the patient was discharged from the TCU to her home in the memory care unit.
CHAPTER IV

OUTCOMES

Over the course of PT intervention, the patient showed improvements in lower extremity ROM, strength, pain levels, ambulation, and overall function. Rapid improvements occurred initially as her pain was reduced and weight bearing was more tolerable. Table 3 illustrates the patient’s strength and AROM of lower extremities at the time of her initial evaluation and at discharge. The patient’s strength and AROM improved bilaterally. The patient’s L hip flexion AROM measurement was limited to 90 degrees due to hip surgical precautions, not weakness or pain.

<table>
<thead>
<tr>
<th>Table 3. MMT Scores and ROM Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMT Strength Score</td>
</tr>
<tr>
<td>R Lower Extremity</td>
</tr>
<tr>
<td>L Lower Extremity</td>
</tr>
<tr>
<td>Hip Flexion</td>
</tr>
<tr>
<td>Knee Extension</td>
</tr>
<tr>
<td>Ankle Dorsiflexion</td>
</tr>
<tr>
<td>Hip Abduction</td>
</tr>
</tbody>
</table>

The patient progressed in functional mobility, transfers, and ambulation. She improved in all categories at each re-evaluation and at final discharge (see Table 4). At the time of discharge, the patient continued to utilize a front-wheeled walker for assistance during ambulation and standing pivot transfers resulting in a modified independent status. She was able to ambulate a distance of
300 feet which allowed the patient to be able to walk to the dining area in the memory care unit for meals and participate in group activities.

### Table 4.
**Functional Mobility Level of Assist**

<table>
<thead>
<tr>
<th>Mobility Task</th>
<th>Initial</th>
<th>Reevaluation 1</th>
<th>Reevaluation 2</th>
<th>Reevaluation 3</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supine to Sit</td>
<td>MAX</td>
<td>Modified I</td>
<td>Modified I</td>
<td>Independent</td>
<td>Independent</td>
</tr>
<tr>
<td>Sit to Supine</td>
<td>MAX</td>
<td>Modified I</td>
<td>Modified I</td>
<td>Independent</td>
<td>Independent</td>
</tr>
<tr>
<td>Sit to Stand</td>
<td>MAX</td>
<td>MIN</td>
<td>Contact Guard</td>
<td>Stand By</td>
<td>Modified I</td>
</tr>
<tr>
<td>Stand Pivot</td>
<td>MAX</td>
<td>MIN</td>
<td>Contact Guard</td>
<td>Stand By</td>
<td>Modified I</td>
</tr>
<tr>
<td>Ambulation</td>
<td>Unable</td>
<td>40 feet MIN</td>
<td>100 feet</td>
<td>225 feet</td>
<td>300 feet</td>
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<td>Contact Guard</td>
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<td>Timed Up and Go Test</td>
<td>Unable</td>
<td>Unable</td>
<td>27 seconds FWW</td>
<td>24 seconds FWW</td>
<td>23 seconds FWW</td>
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<td>Contact Guard</td>
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In addition to strength and functional improvements, the patient was able to perform the Timed Up and Go Test in 23 seconds with the use of a front-wheeled walker. This was an improvement from her initial TUG time of 27 seconds. Any score under 24 seconds indicates the patient is at a decreased risk of falling. Even though the patient would not have to ascend or descend stairs in her home, she was tested on her ability to navigate four steps with the assistance of one railing. She was able to complete this task safely with stand by assist from the therapist. This is a useful measurement of her overall strength and balance. Using stairs may also be necessary when visiting friends or relatives, attending social activities, or navigating other buildings in the community. A MMSE was not performed at the time of discharge because of the lack of progression expected with her diagnosis of dementia. Overall, the patient was able to
meet all of the goals that were set at the time of her initial evaluation and was discharged to her prior residence at a memory care unit.
CHAPTER V
DISCUSSION

Patients with cognitive impairments may present physical therapists and other healthcare professionals with unique challenges during the course of their treatments. An in depth understanding of dementia and how to individualize interventions is a key component for successful treatment of these patients. Furthermore, patients with orthopedic conditions such as a femoral neck fracture require immediate and prolonged rehabilitation to avoid the many serious complications that can occur. Some of these complications include an increased risk for subsequent falls, pneumonia, anxiety, and fatality. The co-existence of cognitive impairment and hip fracture multiplies the risks of poor outcomes and therefore must be meticulously treated and monitored. Literature has described the rehabilitation of patients with hip fracture and hip arthroplasties or patients with dementia, but minimal studies exist on the combination of both. This case report blends the two pathologies together and looks at one successful way of treating a hip fracture with cognitive impairment as a comorbidity.

One strategy incorporated into the plan of care for the patient in this case report was the frequent use of verbal and tactile cueing. These cues were an essential aspect of treating the patient during physical therapy sessions. The focus on tactile cueing assisted the patient with maintaining proper form and completing all repetitions of the exercises performed. Proper form when exercising, even at a low intensity, increases targeted muscle activation and strength. This patient showed improvement throughout the duration of her physical therapy intervention, and
she was able to regain function, strength, and independence allowing her to achieve her goals and return home.

Other factors could have contributed to the successful outcomes of this patient. The patient was able to participate in multiple therapy sessions per day with the inclusion of occupational therapy. She also was able to have assistance at all times from the facility staff members outside of therapy sessions. This helped to prevent falling and to avoid more harm to the damaged hip joint and musculature. Because there is no way to compare a control group to an experimental intervention group with an individual case report, it is difficult to decipher exactly what component of treatment was the most influential on the final outcomes. Some limitations of this case report included the lack of a subjective functional outcomes questionnaire and follow up after the patient was discharged from the transitional care unit facility. Subjective questionnaires are a good way to measure the patient’s perception of her overall health and well-being and demonstrate progress from the initial evaluation to discharge. Two different functional outcome questionnaires may have been appropriate to use to measure progress for this patient; the Fear of Falling Avoidance Behavior Questionnaire and the Lower Extremity Functional Scale. Both of these outcome measures have evidence to support their effectiveness. A long-term follow up of a patient is typically not done in a case report. However, it would have been beneficial to monitor how the patient transitioned back into her home environment and determine if the progress gained during therapy was lasting or temporary.

There are some aspects of the plan of care for this patient that could have been adjusted. It may have been beneficial to include a home visit to determine if any changes to her memory care unit should have been made. This could help to prevent the patient from falling once she returned home. The exercise interventions could have also included more functional activities
such as reaching and balancing while putting away clothes or dishes. The exercise intensity could have been progressed more quickly. Geriatric patients with hip fractures may benefit from lower repetitions with higher amount of weights during lower extremity exercises. A study by Sylliaas,$^{18}$ showed patients who performed lower extremity exercises at 80% of their one repetition max improved significantly in the Berg Balance Scale, Sit-to-Stand test, Timed Up-and-Go Test, Maximal Gait Speed, 6-Minute Walk Test, The Nottingham Extended Activities of Daily Living, and the Short-Form-12 Health Status Questionnaire after six and nine months of follow up. Another evidence based intervention to decrease risk of falls is treadmill walking with projected visual context. A study by Ooijen,$^{19}$ showed that geriatric patients with hip fractures may benefit more from an adaptability treadmill versus traditional physical therapy interventions. In this study, the adaptability treadmill projected images to cue different step and stride lengths, gait speeds, and stepping over obstacles. This may have been too advanced for the patient in this case study; however, this intervention strategy may be a useful tool for patients with hip fractures who are community ambulators and have normal cognition.

This case report has provided many opportunities for further research. Research could be conducted on the use of tactile cueing for patients with cognitive impairment compared to verbal or no cues. There could also be research on effective Physical Therapy interventions to reduce the risk of falling in patients with dementia and Alzheimer’s disease.$^5$ This would be especially beneficial because patients with cognitive impairments are more likely to fall. Balance training is another area of study that would help to determine the optimal exercise program to prevent falls before they occur. The research options that relate to this case study are vast and could cover a variety of topics.
Clinical experience is one of the keys to effective learning. I feel I have learned and applied knowledge in the clinic for all of the patients I have treated up to this point in my career. However, I found the treatment of the patient in this case study to be unique due to her cognitive impairment. She was able to make improvements in function and independence in order to meet her goal of going home. I think the gradual initiation of weight-bearing activities helped to build rapport with the patient. She may not have trusted me with the remainder of her physical therapy care if the initial interventions caused too much pain. Tactile cueing is another method of physical therapy care that was utilized for this patient. This worked well to improve the patient’s form and focus as she performed strengthening exercises. I will continue to use this approach when treating patients with cognitive impairments in my career as a physical therapist.

There are some aspects of treatment for this patient that I would do differently now. I would focus more on functional activities during strengthening and endurance exercises. I think she would have benefited from completing ADL tasks during therapy such as putting away clothing, cleaning, reaching into the cupboard. I should have discussed with the patient and healthcare providers at her memory care unit about what activities the patient would be responsible for when she returns home. This would have assisted me in creating a more personalized and functional exercise plan. Overall, I have learned many things when providing physical therapy treatment for the patient in this case study. I have developed skills that will be useful when working with patients with cognitive impairment and/or orthopedic conditions.
have also gained confidence in my abilities to treat more complex patients and grasped a better understanding of skills and knowledge I still need to develop as I continue my life long education of patient care.
REFERENCES


