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Jordan Clevy
Governors State University

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**Effects of Early physical Therapy Intervention in the
Rehabilitation of a Total Hip Arthroplasty Revision with an
Anterior Approach**

Case Report

By

Jordan Clevey, SPT

B.S., Northern Illinois University, 2007

Submitted in partial fulfillment of the requirements

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Governors State University

University Park, IL 60484

ABSTRACT

Advances in medical technology have greatly changed the way surgeons perform surgical procedures. The push by surgeons and their patients for less invasive surgeries has caused surgeons to turn to an anterior approach for total hip arthroplasty and revisions of total hip arthroplasty. The less invasive nature of the anterior approach has led to faster recovery time and less pain. Nearly all total hip arthroplasty and revision patients will receive physical therapy services to guide and assist the patient in a steadfast recovery. This case study explores the results of functional physical therapy interventions on an 80 year old female post total hip arthroplasty revision.

INTRODUCTION

It is estimated that 332,000 people will receive a hip replacement this year making total hip arthroplasty a leading surgical intervention to increase patient function and reduce pain¹. Almost all of these patients will receive physical therapy to assist with their recovery towards their highest level of function. New surgical techniques and approaches have greatly reduced patient mortality and improved patient prognosis.² Previously surgeons performed hip replacements with a posterior approach. A posterior approach is a moderately invasive surgery that calls for the surgeon to compromise the hip extensor muscle group in order to place the hardware that is a hip arthroplasty. Today highly skilled surgeons are performing THAs or total hip arthroplasties with an anterior approach allowing for faster return to function, reduced pain, and less risk of infection due to the much more minimally invasive nature of the surgery.² There are many conditions which are indicative of hip replacement surgeries such as osteoarthritis (OA), rheumatoid arthritis (RA), avascular necrosis, and trauma typically causing a complex fracture.² A typical hip arthroplasty will last 15 to 20 years before it is indicative to replace or revise the hardware. It is estimated that 18 out of every 100 patients will need a hip revision or a fixation of the internal hardware acting as the hip joint.³ There is a need for data exploring the best possible physical therapy interventions to rehabilitate patients who have

received a hip revision. In this case study I will discuss the methods used in the physical therapy management of a single anterior approach hip revision patient with focus on interventions and functional outcomes.

PATIENT DESCRIPTION AND HISTORY

The patient in this case study who I will refer to as Ms. S was an 80 year old female who was the recipient of a hip revision in mid-September, 2014. This patient underwent the revision to replace the acetabular and shaft components of a total hip arthroplasty that took place 12 years previously. The patient had a THA performed on her left hip originally 12 years ago secondary to OA. The initial THA was successful. Recently a revision to the patient's original THA was indicated due to the loosening of the acetabular component causing pain and dysfunction that was debilitating to the patient's life roles and activities of daily living. Ms. S was a retired seamstress whom has had bilateral total hip arthroplastys and a left total knee replacement. All three replacements were successful proven by self reported improvement in her function and pain levels. Ms. S was a physically active and fit patient in relatively good health despite her history of multiple joint replacement surgeries, GERD, DJD, HTN, PAD, and hypothyroidism. Ms. S was widowed and lived alone. She previously spent her time with her grandchildren and outdoors with neighbors until most recently when her left hip began to trouble her. In the past months before the surgery Ms. S became unable to ambulate more than 100 feet and required modification

for bathing and self-care due to 8-9 out of 10 pain levels on the VAS for pain. She pursued hip revision surgery to return to a functional ambulatory status not restricted by pain. The patient was transferred to our skilled nursing facility after surgery 4 days post to receive rehabilitation services. Ms. S hoped to return to her one-story ranch style home with 5 steps to enter. She no longer drove due to being legally blind in her right eye and reports poor peripheral vision in her left. Prior to surgery Ms. S used a single point cane with distances greater than 5 feet.

CLINICAL IMPRESSION

A patient who undergoes a total hip arthroplasty almost always receives skilled physical therapy to assist in their recovery. Barker et al⁴ shows that when compared to a traditional rehabilitation program, an accelerated program consisting of therapy twice a day, additional hip and knee strengthening exercises, range of motion, and functional tasks including walking and stair negotiation allowed for faster and greater improvements in patient function to be recorded compared to patients posterior approach total hip arthroplasty. Without skilled physical therapy THA patients are at risk for debility defined by poor strength, range of motion, high pain levels, falls, pressure sores, deep vein thrombosis, and poor activities of daily living completion.³ Unless post-surgical complications arise, patients typically make a full recovery improving their function with the assistance of physical therapy services.

Ms. S was a good candidate for this case study because she was previously functioning independently until complications arose resulting in the need for THA revision. Let it be known that the complications the patient began to experience were expected in a THA as old as hers. It was known that her original THA surgery left her with no unexpected deficits which is the case in a majority of THA patients. Ms. S's examination and progress were recorded by documenting functional tasks and objective measures such as; standing time with no upper extremity support (recorded using a wall clock), pain levels (using the Visual Analogue Scale for pain), Ambulation distance (measured in feet), stair negotiation (counting stairs ascended and descended), muscle strength (manual muscle testing performed by the treatment administering therapist under the guidelines set *in Daniels and Worthingham's Muscle Testing: Techniques of Manual Examination*⁵) and range of motion (recorded with a goniometer and conducted using the guidelines set in *Joint Range of Motion and Muscle Length Testing*⁶)

EXAMINATION

The initial physical therapy examination was conducted in the patient's room at the skilled nursing facility she would remain in for the next 3 weeks. The examination consisted of testing bilateral lower extremity range of motion, muscle strength, sensation, transfers, bed mobility, and functional activities such as walking and standing balance. The patient was instructed verbally through the examination and given visual and tactile cues when needed.

Because the patient's hip both received surgical interventions, she was familiar with the examination process allowing for a smooth sequence. Because of the patient's age and pain levels ROM was taken actively in supported standing for three major hip motions; flexion, abduction, and extension. The results can be found in Table 1. Muscle strength tested 4-/5 grossly for the affected left lower extremity. Ms. S did report an increase in pain during muscle testing which may be expected in post-operative THA patients. Sensation and bed mobility were within functional limits or WFL. The examination results for transfers, gait, stairs, and balance can be found in Table 2. The patient's ROM and muscle strength were found to be WFL for the patient's unaffected right lower extremity and were not further monitored or recorded for changes.

Table 1. Hip AROM at initial examination and discharge

| Hip motion | Examination | Discharge |
|------------|-------------|-----------|
| Flexion | 0° – 55° | 0° – 104° |
| Abduction | 0° – 20° | 0° – 25° |
| Extension | 0° – 14° | 0° – 18° |

Table 2. Functional activity findings at initial examination and discharge

| Functional activity | Examination | Discharge |
|---------------------|---|--|
| Transfers | Patient avoided unnecessary weight bearing and pressure through her left leg causing her right leg to do most of the work. The patient needed minimal assistance. | The patient was fully independent requiring no assistance, guidance, or assistive device when transferring to any surface. |
| Gait | The patient was able to ambulate with minimal assistance and a front wheeled walker. She demonstrated a decreased stance time on her left leg causing a step too pattern. She was able to travel 100 feet before requesting her wheelchair due to increased pain levels surrounding her left hip. | The patient was able to ambulate 2000+ feet with a single point cane without requiring a break. She demonstrated a desirable gait pattern both symmetrical and stable when using a single point cane. |
| Stairs | Stairs were not attempted at the initial examination due to the risk of falls and elevated pain levels from the previously completed examination procedures. | The patient was able to negotiate 10 stairs without assistance. She did require the use to guard rails for safety. Ms. S utilized a step too pattern when negotiating stairs typically leading with her unaffected leg when ascending and leading with her effected leg when descending. |
| Balance | The patient was able to demonstrate a good static standing balance. She stood unsupported in place for 1.5+ minutes displaying no loss of balance when turning her head. The patient was unable to maintain unsupported balance for | The patient demonstrated good dynamic standing balance proved by her ability to walk backward, strafe left/right, braid, and walk while turning head all with a single point cane. |

| | | |
|--|--|--|
| | both dynamic standing balance and decreased base of support. | |
|--|--|--|

DIAGNOSIS/PROGNOSIS/PLAN OF CARE

The findings from the initial examination were consistent with what was to be expected after a successful hip revision surgery. The patients AROM, muscle strength, and activity tolerance were all found to be impaired suggesting the need for physical therapy to restore Ms. S to a functional level. Ms. S’s impairments placed her in musculoskeletal practice pattern H defined by Impaired Joint Mobility, Motor Function, Muscle Performance, and Range of Motion Associated with Joint Arthroplasty.⁷ Because of Ms. S’s strong family support, independent prior level of function, drive to participate in therapy, and successful surgery she was given a good prognosis to return to independent function. It was expected that the patient would ambulate community distances safely with the use of an assistive device, dress/bathe/cook independently, and experience pain levels within normal limits.

Ms. S’s plan of care would be based around her needs. Ms. S wanted to return home at the end of the 20-day that period Medicare fully funds. She would participate in physical therapy for 90 to 100 minutes a day, 6 days a week. Visits were typically split into morning and afternoon sessions.

Treatment would focus on strengthening, ROM restoration, pain relief

techniques, muscle coordination, gait training, balance training, and improving standing tolerance. Goals were set for the patient to better demonstrate functional improvement. The patient's goals were as follows:

1. Patient will demonstrate good dynamic standing balance with no loss of balance requiring 0% cues for safety.
2. Patient will demonstrate a standing tolerance of 15 minutes to facilitate ADL completion.
3. Patient will ambulate 1000 feet with assistive device safely with no instruction.
4. Patient will demonstrate left lower extremity muscle strength of at least 4+/5 grossly.
5. Patient will be independent in all bed mobility and transfers requiring 0% cues from instructor.

INTERVENTIONS

Often after a patient has undergone a surgical procedure requiring physical therapy the surgeon will ask that the patient follows a specific rehabilitation protocol designed by the surgeon. In the case of Ms. S no protocol was given, allowing the physical therapist to devise a program that he see fit.

Ms. S attended 17 inpatient visits nearly all of which were twice a day over a period of 22 days. Facility equipment such as ankle weights, Therabands, Swiss balls, parallel bars, and assistive devices were used in association with the interventions provided. Interventions were progressed throughout the course of treatment and are described in the following segments.

1st week of postoperative interventions

Initially strengthening and ROM exercises were indicated by the patients

muscular weakness and limited range of motion. Exercises focusing on core, hip, and knee musculature were carried out bilaterally to address the patient's deficits. Pain levels were little issue as medication intake was coordinated to best suit the patient for therapy. If pain arose an ice pack was placed on the area for 20 minutes allowing the patient to rest. Short distance gait training was conducted to increase the patient's function with nursing staff, prevent the effects of OA, and prevent blood clots from forming in the lower extremities.⁸

2nd week of postoperative interventions

Once Ms. S made gains in strength and ROM, the focus of therapy began to shift towards improving patient function and independence. Strengthening exercises were then conducted in standing as to challenge the patient's balance and improve standing tolerance. Gait training with a front wheeled walker focused on improving distance and gait techniques such as cadence and step length symmetry. Static standing balance was challenged daily by narrowing Ms. S's base of support for 30 second intervals, progressing in difficulty until the patient needed assistance for balance. Muscle coordination was challenged by rhythmic stabilization exercises that focused on opposing hip muscle groups (abductors/adductors and flexors/extensors).

3rd week of postoperative interventions

The third and final week would focus on further improvements in gait, balance, and stair negotiation. Gait training was progressed by ambulating

distance up to 1000 feet with a single point cane without rest breaks. Dynamic balance exercises were conducted challenging the patient's single leg stance time, strafe walking, backwards walking, and braiding as to challenge Ms. S's coordination and train her to safely navigate tight areas such as restrooms and elevators. Ms. S was trained on safest techniques to negotiate curbs/stairs to ensure independence in the community upon discharge.

OUTCOMES

Ms. S's inpatient care lasted 20 days consisting of 17 visits most of which broken into morning and afternoon sessions. The patient's functional outcomes can be found in Table 2. Functional outcomes often do not have reported psychometric values since it is understood they test exactly what you want to test and that the patient is doing the task to the best of their ability. A study conducted by Minnesota State University and Mankato found manual muscle testing to have an inter-rater reliability of .97 which is excellent.⁹ Ms. S verbally stated many times how satisfied she was with her progress. She also stated how she would now be able to clean her basement with her function and absence of pain. All goals therapist derived goals were met by the time of discharge for this patient.

DISCUSSION

Total hip arthroplastys and hip THA revisions are more often being performed with an anterior approach in recent years. The anterior approach allows for a less invasive surgery and faster recovery time for the patient. The surgical technique for an anterior approach can be found in an article by Mast and Laude, MD¹⁰ and in another article by Zirin, Sherif, and Matta¹¹. The interventions described in this case study were all seen as appropriate and beneficial based on the idea that addressing the patient's functional deficits would best assist patient recovery to independent function. It is not known if the patient would have made as timely and vast of a recovery without physical therapy intervention, but it is advised by a majority of surgeons that the patient seek such services. Assumptions on what is the best therapy protocol should not be made from this case study alone. It is advisable to seek literature on controlled studies to determine what the best route for recovery of any patient is. A controlled study comparing functional interventions to standard interventions and/or no physical therapy received would be the best possible evidence to determine the true validity of this case study. There were no conflicts of interest or biases when performing this retrospective study. The author received no incentive of any kind.

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