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Physical Therapy On The Function Of A Patient With Stage III Parkinson's Disease: A Case Report

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Trancygier, Effects of Physical Therapy on the Function of a Patient with Stage III Parkinson’s Disease:
A Case Report

University of New England

Department of Physical Therapy

PTH 608/708: Case Report Template

Name: Kelly Trancygier ✓ Title: Effects of Physical Therapy on the Function of a Patient with Stage III
Parkinson’s Disease: A Case Report

Please use this template for Week 2-12 assignments, as clearly outlined both in blackboard and the syllabus, by entering the necessary information into each section under the appropriate headers as assigned and submitting to blackboard. Once a section is complete and has been graded, you may delete the instructions provided in grey. Feel free to work ahead as your case allows, but only assigned sections will be graded by the due dates. Please start by adding your name above and in the header, and once you develop your title, a “running” or abbreviated title. This same template will be used for PTH708, and will be completed throughout the fall.

All responses should be in black text, 12-font, Times New Roman, and double-spaced with proper grammar and punctuation. Track changes must be switched OFF. Any assignments submitted in unacceptable condition as determined by the faculty will be returned to the student for resubmission in three days for a maximum score of 80%.

All case reports are written in *past tense*, so ensure that your submissions are past tense. No patient initials are necessary; please refer to your subject as “patient” throughout the manuscript.

Academic Honesty:

You may use any resources at your disposal to complete the assignment. You may not communicate with other UNE students to obtain answers to assignments or share sources to submit. Proper citations must be used for referencing others’ published work. If you have questions, please contact a PTH608 course instructor. Any violation of these conditions will be considered academic dishonesty.

By entering your name, you are affirming that you will complete ALL the assignments as original work. Completing an assignment for someone else is unethical and is a form of academic dishonesty.

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By typing your name here, it is representative of your signature.

34 **Effects of Physical Therapy on the Function of a Patient with**
35 **Stage III Parkinson's Disease: A Case Report**

36

37 Kelly Trancygier

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47 The patient signed an informed consent allowing the use of medical information for this report
48 and received information on the institution's policies regarding the Health Insurance Portability
49 and Accountability Act.

50

51

52

53 The author acknowledges Michael J. Fillyaw, PT, MS for assistance with case report
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64 **ABSTRACT**

65 **Title:** Effects of Physical Therapy on the Function of a Patient with Stage III Parkinson's
66 Disease: A Case Report

67 **Background and Purpose**

68 Parkinson's disease (PD) is typically diagnosed in individuals over the age of 60.^{1,2} The
69 patient in this case report was diagnosed at age 49 which is considered young-onset PD.³

70 PD affects 1.5% of the US population over the age of 65.⁴ Although there is no cure and
71 the disease itself is not fatal, its effects can be very debilitating. PD typically occurs in five
72 stages.

73 **Case Description**

74 The patient was a 54-year-old female that presented to physical therapy with a diagnosis
75 of PD. Initially, she presented with impaired balance, limited range of motion (ROM), impaired
76 standing posture, impaired gait, and decreased flexibility. Outcome measures included the Lower
77 Extremity Functional Scale (LEFS) and Timed "Up and Go" (TUG). The interventions
78 performed included proprioceptive and closed kinetic chain exercises, gait training, transfer
79 training, and manual therapy.

80 **Outcomes:**

81 LEFS, balance, ROM, and flexibility improved, while strength remained unchanged.
82 With gait training and transfer training, however, TUG scores remained the same. Although the
83 patient demonstrated improvements in some of the outcome measures, she was unable to achieve
84 all of her goals for physical therapy. For future patients with similar presentations, a revision of

85 the original interventions, in conjunction with additional interventions, may be effective in
86 treating patients with young-onset PD.

87 **Discussion**

88 This case report was designed to assess the outcomes of multiple physical therapy
89 interventions on a patient with stage III, young-onset PD. Future research should be conducted to
90 further study the best physical therapy interventions needed to improve functional outcomes for
91 patients with stage III PD.

92

93 Manuscript Word Count: 3,340 ✓

94

95 **BACKGROUND AND PURPOSE**

96 Parkinson's disease (PD) is a chronic, progressive neurological disorder that affects
97 movement. It is the second most common neurodegenerative disorder after Alzheimer's and
98 affects 1.5% of the U.S. population over 65 years of age.¹ Most often, the initial diagnosis is
99 made between 40 and 70 years of age, but as a rule it begins in people over the age of 60.^{2,3} PD
100 occurs when the neurons in the basal ganglia of the brain stop producing enough dopamine.
101 Dopamine is a neurotransmitter that helps to regulate body movements and emotions. When
102 there is a reduction of dopamine in the brain, the motor symptoms of PD begin to appear. The
103 basal ganglia in the brain help regulate muscle tone as well as the force that muscle produces and
104 select and inhibit motor synergies. When a person's basal ganglia stop functioning properly, their
105 voluntary muscle movements become affected.⁴ Symptoms of PD include a slight shaking or
106 tremor of the hand or fingers that may be barely noticeable at first. Other symptoms are stiffness
107 of the extremities and trunk, bradykinesia, and impairments of posture and balance. As the
108 disease progresses, a person may develop loss of involuntary movements such as blinking,
109 smiling, and the ability to swing their arms back and forth while walking. Problems with speech
110 patterns and difficulty in writing may also occur.⁵

111 There is no cure for PD and the disease itself is not fatal. The onset of PD is usually
112 gradual, and with the use of medication and therapy the progression can be slowed. The exact
113 cause of PD is unknown, but some researchers feel there may be a combination of a genetic
114 component, environmental factors such as exposure to insecticides, herbicides, etc., and aging
115 that plays a role in causing PD. In order to achieve the best outcomes, the focus must be on early
116 detection and initiation of treatment in order to slow the progression of the disease.¹

117 PD is associated with multiple other co-morbidities. Dementia and pneumonia are a

118 common cause of death in patients with PD.⁶ However, constipation, diseases of the circulatory
119 system such as hypertension and ischemic disease, as well as diseases of the endocrine system
120 (diabetes mellitus), urinary incontinence, depression, osteoarthritis, and cancer have been
121 reported. Patients with PD also experience nutritional deficiencies due to difficulty swallowing
122 and other types of metabolic diseases.⁷

123 Typically, there are five stages of progression of PD, however, not all patients will
124 experience all of the symptoms. If they do, they may not occur in the same order or at the same
125 level of intensity. In the initial stage, patients may notice a slight hand tremor that could appear
126 on one side of the body. This may be barely noticeable to friends and family. Patients may also
127 experience changes in gait and facial expressions. During the second stage, symptoms become
128 worse and progress to both sides of the body. Activities of daily living (ADLs) become difficult
129 but the person is usually able to live independently. Patients may still be able to live alone, but
130 due to problems with gait and balance, falls are common. ADLs become more difficult and some
131 patients may need assistance from a caregiver to help with ADLs such as bathing, dressing, and
132 eating. During stage four, the symptoms are severe and assistance from a caregiver is required.
133 Patients may need to use a walker for ambulation to prevent falls. In the final stage of PD, the
134 symptoms become very debilitating. The patient may need a wheelchair or be bedridden. In this
135 stage, patients develop many of the non-motor symptoms associated with PD such as depression,
136 dementia, urinary incontinence, and speech and swallowing disorders. During this final stage, the
137 patient requires around the clock care and needs maximum assistance with most ADLs.⁸

138 After the initial diagnosis of PD, a patient should have an evaluation by a physical
139 therapist to develop a baseline of their physical status.⁹ As the disease progresses, functional
140 mobility slowly declines. Regular exercise has shown to be beneficial for patients with PD.

141 Exercises to maintain good posture, increase arm, leg, and core muscle strength, increase muscle
142 flexibility, and those that improve balance and gait are also important. Therapeutic exercises may
143 include aerobic, endurance, and strengthening exercises, and neuromuscular re-education
144 includes balance training. Some examples of therapeutic exercises specific to patients with
145 balance problems are proprioceptive and closed kinetic chain exercises. There are physical
146 therapy interventions that can help improve an individual's ability to perform their ADLs and
147 functional activities such as manual stretching, soft tissue massage, and joint mobilization.¹⁰

148 An individualized plan of treatment to address posture, gait, and balance is beneficial to
149 prevent falls and related injuries. Working with a physical therapist and other members of the
150 health care team can help patients and families develop strategies to improve functional mobility
151 and to prevent injuries resulting from falls. The goal is to allow the patient to maintain their
152 independence with daily activities and remain safe in their homes and in the community.¹⁰ This
153 case reports the outcomes of multiple physical therapy interventions including aerobic and
154 endurance exercises, strengthening exercises, and balance and gait training on a patient with
155 stage III PD.

156

157 **CASE DESCRIPTION**

158 **PATIENT HISTORY AND SYSTEMS REVIEW**

159 The patient was a 54-year-old female diagnosed in March 2012. She lived at home with
160 her mother and father in a one-story house with three steps to enter the home and no railing
161 present. She had been divorced for four years. Some of her hobbies included drawing, coloring,
162 and painting. She worked previously as an insurance agent before her diagnosis, and the disease
163 has now progressed to the point that it is too difficult for her to continue working.

164 In addition to PD, her health history included anxiety disorder, hearing impairment,
165 bowel and bladder involvement, dizzy or fainting spells, past fractures, hernia, liver/gallbladder
166 problems, and Meniere's disease. She was a non-smoker and non-drinker. The patient reported
167 pounding in her head during the initial evaluation and most of the sessions following that she
168 attributed to the tinnitus. Surgical history includes a left total hip arthroplasty (THA) in May
169 2013, cholecystectomy in 2013, and a bilateral deep brain stimulator implanted in March 2017.
170 The patient did not report any recent tests.

171 She reported increased difficulties with bed mobility and transfers such as sit to stands,
172 lower extremity weakness, limited flexibility, gait abnormalities, and limited flexibility of her
173 hip and knee musculature. She was unable to drive and unable to perform most ADLs by herself.
174 Her mother and father had to help her with most of her ADLs. The patient and family goals were
175 to improve balance, strength, and gait, as well as to perform ADLs independently. The systems
176 review can be found in Table 1.

177 The patient gave a written consent to release information relating to demographics and
178 medical history prior to the start of the initial evaluation.

179

180 **CLINICAL IMPRESSION 1**

181 Based on the information gathered during the history and systems review, the
182 impairments found secondary to PD, osteoarthritis, and Meniere's disease were of the
183 musculoskeletal and neuromuscular systems. The patient presented with impairments in balance,
184 functional abilities, motor control, range of motion (ROM), strength, and gait. Based on her
185 history, it was hypothesized that her deficits were causing the increased difficulty with ADLs.

186 She did not mention having difficulty performing her hobbies which included painting, drawing,
187 and coloring.

188 The patient's medical diagnoses were confirmed by her doctor so there were no
189 differential diagnoses at the time. The next step was to collect objective measurements for ROM,
190 strength, balance, flexibility, and functional ability and to develop her physical therapy plan of
191 care based on that data. There were no special tests performed, other than flexibility tests. The
192 plan was to decrease her impairments, activity limitations, and participation restrictions. The
193 assessment revealed that she was a good candidate for physical therapy and had good potential to
194 succeed in therapy. This was determined by her good family support, willingness to participate,
195 and motivation to improve. Her expectations of therapy were to prevent any further decline or
196 loss of independence.

197 This patient is a good candidate for a case report based on numerous comorbidities and
198 her young age as it relates to her diagnosis of PD.

199

200 **EXAMINATION – TESTS AND MEASURES**

201 ROM, manual muscle testing (MMT), palpation, Five-Times-Sit-to-Stand Test (FTSST),
202 flexibility, Lower Extremity Functional Scale (LEFS), and Timed "Up & Go" (TUG) were all
203 performed.

204 ROM was measured using a standard goniometer. Flexibility tests for hamstrings,
205 piriformis muscles, hip adductors, iliotibial bands, rectus femoris muscles, and gastrocnemius
206 muscles were used to define muscle length.

207 MMT was performed using the techniques described by Kendal.¹¹ Cuthbert et al¹² found
208 that MMT has good reliability and validity for patients diagnosed with a neuromusculoskeletal

209 dysfunction. During the patient's initial evaluation, she scored a five out of five indicating no
210 limitations of strength.

211 Palpation was performed to assess the extensibility and density of soft tissue as described
212 by O'Sullivan et al.¹³ This was performed on both the involved and uninvolved lower extremity
213 to achieve a baseline and a comparative value. All three techniques, including goniometric
214 measurements, MMT, and palpation, are widely used by many clinicians.

215 Flexibility of the hamstrings, piriformis muscles, hip adductors, iliotibial bands, rectus
216 femoris muscles, and gastrocnemius muscles were assessed as described by Magee.¹⁴ A straight
217 leg raise (SLR), piriformis test, hip abduction ROM, Ober's test, Thomas test, and dorsiflexion
218 ROM were used to assess the length of the muscles listed, respectively. Tests and measures
219 including the piriformis test, hip abduction ROM, Thomas test, and dorsiflexion ROM are all
220 well-known by physical therapists and used to assess muscle length Melchione & Sullivan¹⁵
221 recommend the Ober's Test to indirectly assess iliotibial band length. Gajdosik et al¹⁶ found that
222 the intra-class correlation coefficients for the SLR with stabilization straps is 0.83 and with low
223 back flat is 0.88.

224 The TUG measured static and dynamic balance. Scores greater than 20 seconds indicate
225 the need for assistance with ambulation and greater than 30 seconds indicates a high risk for
226 falls.¹⁷ TUG test time of >16 sec is at an increased fall risk (OR 3.86, CI 1.05, 14.27, P=0.043).¹⁸

227 FTSSST evaluated balance during transitional movements, such as sitting to standing. The
228 sensitivity of this test is 66% and specificity is 67% if the patient can perform the test in 13
229 seconds or less.¹⁹ The patient performed the test in 49.5 seconds with the use of her upper
230 extremities.

231 The LEFS determines the level of difficulty the patient was having with everyday tasks.
232 It is an 80-point scale that consists of twenty questions. The LEFS measures a patient's initial
233 function, their ongoing progress and outcome, and helps the clinician set functional goals. The
234 LEFS has a test-retest reliability of 0.98.²⁰ The results of these tests can be found in Table 2.

235

236 **CLINICAL IMPRESSION 2**

237 The initial impression was confirmed based on the information collected during the initial
238 evaluation. It was noted that the patient's impairments were directly related to her multiple
239 diagnoses of the musculoskeletal and neuromuscular system and to her activity limitations and
240 participation restrictions. The information verified that this patient would continue to be a good
241 candidate for the case study. This data included her impaired balance, limited ROM, impaired
242 standing posture, impaired gait, and decreased flexibility.

243 Physical therapy diagnoses included R26.2: Difficulty in walking, not elsewhere
244 classified, R26.89: Other abnormalities of gait and mobility, R27.9: Unspecified lack of
245 coordination, and G20: Parkinson's disease.²¹ Her prognosis at the time of the initial evaluation
246 was good based on her eagerness to improve, good family support, and young age. Her history
247 of multiple surgeries, Meniere's disease, increased risk for falls, and diagnosis of PD contributed
248 to her difficulties in performing ADLs. The patient complained of pounding in her head at the
249 initial evaluation and stated that it is a regular occurrence that caused her to need assistance to
250 perform daily activities.

251 Goodwin et al²² stated that strength can be improved or maintained in patients with PD.
252 They showed that physical therapy can also slow the rate of functional decline making this a
253 positive prognostic indicator to this case.

254 The plan was to have her participate in physical therapy two times a week for six weeks.
255 The interventions during the course of physical therapy were directed at addressing the problems
256 previously listed. The goals for this patient included: decreasing risk of falls, decreasing burden
257 on caregivers, improving bed mobility, increasing balance, an improvement with listed tests and
258 measures such as LEFS, goniometric measurements, strength testing, balance testing, and TUG
259 scores. (Table 2 and 3.) At this time, it was decided that no referrals or consultations were
260 needed.

261 The plan involved home exercise program, manual therapy techniques, neuromuscular re-
262 education, therapeutic activities, therapeutic exercise, stretching/flexibility activities, soft tissue
263 mobilization techniques, and self-care/home management. No other tests or measurements
264 needed to be performed at this time.

265

266 **INTERVENTIONS**

267 **Procedural Interventions**

268 Interventions for this patient were chosen to assist in improving balance, flexibility, gait,
269 ROM, pain, and her ability to perform ADLs. Due to the patient's impaired balance,
270 interventions including proprioceptive and closed kinetic chain exercises were performed.
271 Manual therapy, such as manual stretching, massage, and joint mobilizations, were chosen to
272 help improve the patient's ROM and ability to perform ADLs, to improve her gait pattern, and to
273 improve transfers including sit to stands. All of the interventions would benefit by helping to
274 decrease her risk of falls.

275 During the first half of the patient's episode of care, manual therapy was performed most
276 often to address the patient's decreased right and left hip ROM. The patient's tight hip and ankle

277 musculature made it difficult for her to perform certain interventions that were needed for her to
278 improve functionally. Therefore, interventions such as heel walking and rocker board exercises
279 were withheld during the beginning of therapy due to her inability to perform those tasks at that
280 time. It was critical that this patient received stretching and mobilization therapy during the first
281 few weeks of treatment based off of the information gathered during her initial evaluation. It has
282 been suggested that stretching can enhance physical performance and physical functioning
283 ability, including walking.²³ The patient had an impaired gait pattern, thus stretching was chosen
284 as an intervention to help elongate her muscles and improve her ambulation. Peripheral joint
285 mobilization can be used to reverse hypomobile joints with progressive vigorous joint-play
286 stretching techniques by elongating capsular and ligamentous connective tissues and was used on
287 this patient's hips to increase her ROM.²⁴

288 Static and dynamic balance training was used on this patient to improve her balance,
289 coordination, and stability. Balance training was incorporated to assist with improvements of the
290 patient's sit to stand transfer and to reduce her risk of falls. A balance study on the effects of
291 balance training and high-intensity resistance training showed improvement in Sensory
292 Orientation Test scores indicating good reasoning behind the use of balance training with this
293 patient.²⁵

294 When exercises got too easy for the patient to perform, the reps, sets, and/or time
295 performing the exercise was increased.

296 Changes to the interventions and HEP were made when the exercise became too easy or
297 the patient was no long benefiting from it. An example of the progress the patient had made was
298 with bilateral hip adductor stretching. This flexibility exercise was discontinued after the fourth
299 week to allow for incorporation of additional balance and soft tissue massage. Manual stretching

300 performed by the patient's mother and father of her hamstrings and adductors was also
301 discontinued. This consisted of increased repetitions or time performing the exercises. The
302 difficulty level for performing balance exercises was increased as the patient plateaued. At times
303 when the patient presented with increased stiffness and tightness, some of the exercises were not
304 performed and more time was spent on manual exercises. If exercises were discontinued from
305 the patient's daily treatment log, the patient was instructed to continue these exercises at home as
306 part of her HEP. Additionally, a summary of the interventions can be found in Table 4.

307 **Coordination, Communication, Documentation**

308 The patient was highly motivated during every session and had a great family support
309 system at home. During the patient's visits to the clinic, it was obvious during conversation that
310 the patient was performing her home exercise program (HEP). The patient, as well as her mother
311 or father, would verbalize what they had worked on since the last therapy session.

312 The patient was seen by one therapist in the clinic during her episode of care. Prior to the
313 beginning of each session, the physical therapist discussed the patient's current status and
314 progression toward established goals were discussed with the patient and her family.

315 Documentation was performed after every visit and reported to the patient's primary care
316 physician after the initial evaluation, sixth visit, and discharge.

317 **Patient-Client Related Instruction**

318 The patient was instructed on a HEP to further address her impairments at home. The
319 progression of the HEP was addressed every two weeks. The patient received written directions
320 of each exercise she was to perform at home with frequency, sets, reps, and/or amount of time
321 she was to perform the exercise. This was used to improve flexibility, functional strength,
322 balance, and gait.

323 Overall, the patient's attendance at physical therapy and compliance with her HEP was
324 outstanding. The patient did not receive any co-interventions during this physical therapy
325 episode of care.

326

327 **OUTCOME**

328 At the initial evaluation, the patient presented with impaired balance, functional abilities,
329 ROM, and gait. These impairments led to ADL and transfer difficulties for the patient.
330 Improvements can be reflected in the results of her LEFS as well as her ROM and flexibility
331 measurements, and reduced tenderness to palpation. At discharge, the patient showed
332 improvements in functional abilities, gait, ADLs, and transfers (see Table 2).

333 The patient was able to meet one of three short term goals and partially met one ~~out~~ of
334 three long term goals. Although she did not meet her goal of single leg stance >15 seconds on
335 each lower extremity, she did improve her time in single leg stance, indicating improvements in
336 her static standing balance. FTSSST times were not performed at discharge due to time spent
337 collecting other data. The patient reported mild improvements with ADLs but still required
338 assistance for bathing, dressing, and forward bending to reach objects from the ground.

339 The patient completed 11 visits, each 60-minutes in length. The patient was set to receive
340 help from Visiting Angels at home after discharge. She reported that she was satisfied with the
341 care and services she had received during this episode of care.

342 Upon discharge, the patient returned home with her mother and father, and planned to
343 hopefully move into an assisted living facility. She was still ambulating in the community with a
344 single point cane and rolling walker, intermittently, and just the single point cane while in her

345 home. The patient, as well as her mother, were educated on home exercises including lower
346 extremity stretches to help maintain mobility.

347

348 **DISCUSSION**

349 This case report demonstrated a progressive physical therapy plan of care in an outpatient
350 clinic for a patient with a diagnosis of stage III PD and multiple other co-morbidities. The
351 physical therapy plan of care was developed to reduce and/or improve the patient's impairments.
352 The interventions during each therapy session were decided each visit based on the patient's
353 presentation that day. Accommodations were made, when needed, for pain and discomfort due to
354 tinnitus and the patient's hip osteoarthritis.

355 There is evidence from a study performed by Goodwin et al²² supporting physical
356 therapy interventions to improve physical functioning, balance, and walking in patients with PD.
357 Hirsch et al²⁵ showed balance interventions increased balance times before falling. This data led
358 to interventions including balance exercises to be incorporated into this patient's plan of care.

359 This patient showed minimal improvement in functional ability with ADLs,
360 balance, functional mobility, and gait. Factors that may have positively influenced her outcome
361 included the therapy provided and the steady emotional support from her family. Future research
362 should be conducted to further study the best physical therapy interventions needed to improve
363 functional outcomes for patients with stage III PD.

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456 **TABLES AND FIGURES**

457 **Table 1. Systems Review**

Cardiovascular/Pulmonary System	Unimpaired
Musculoskeletal System	Impaired: limited hip, knee, and ankle range of motion impaired strength impaired flexibility of hip, knee and ankle musculature impaired standing posture impaired gait
Neuromuscular System	Impaired: standing balance
Integumentary System	Unimpaired
Communication	Unimpaired
Affect, Cognition, Language, and Learning Style	Unimpaired

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468 **Table 2. Results of Test and Measures Performed at the Initial Evaluation and Discharge**
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Measurement	Initial Evaluation		Discharge	
Range of Motion:				
Dorsiflexion	Left active range of motion: 5 degrees	Right active range of motion: -26 degrees	Left active range of motion: 12 degrees	Right active range of motion: 16 degrees
		Right passive range of motion: -5 degrees		Right passive range of motion: 18 degrees
Knee extension	Left active range of motion: 0 degrees	Right active range of motion: -5 degrees	Left active range of motion: 0 degrees	Right active range of motion: -4 degrees
Hip extension	Left passive range of motion: -16 degrees	Right passive range of motion: -16 degrees	Left passive range of motion: not performed	Right passive range of motion: not performed
Hip flexion	Left passive range of motion: 90 degrees	Right passive range of motion: 95 degrees	Left passive range of motion: not performed	Right passive range of motion: not performed
Lower Extremity Functional Scale	Total score: 17/80 17-32 (60-80% impaired)		Total score: 25/80 17-32 (60-80% impaired)	

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Five-Times-Sit-to-Stand Test	49.5 seconds with use of upper extremity support, increased time to begin transfer	Not performed
Timed “Up & Go”	28.0 seconds with single point cane	28.68 seconds with single point cane
Manual Muscle Testing:		
Hip abduction	5/5	5/5
Hip flexion	5/5	5/5
Ankle dorsiflexion	5/5	5/5
Ankle plantarflexion	5/5	5/5
Flexibility:	Left Right	Left Right
Piriformis	moderate restriction moderate restriction	moderate restriction moderate restriction
Adductors	mild restriction mild restriction	mild restriction mild restriction
Iliotibial band	moderate restriction moderate restriction	moderate restriction moderate restriction
Hamstrings	moderate restriction moderate restriction	moderate restriction moderate restriction
Rectus femoris	moderate restriction moderate restriction	moderate restriction moderate restriction
Gastrocnemius	moderate restriction moderate-severe restriction	moderate restriction moderate restriction
Palpation	Palpable tenderness of the right & left psoas, right & left quadriceps, right rectus femoris, right and left tensor fascia lata (right > left)	Palpable tenderness of the right psoas and right quadriceps

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474 **Table 3. Goals for Physical Therapy**

Short Term Goals: to be met in 3 weeks	Long Term Goals: to be met in 6 weeks
1. Patient to decrease pain at worst to 3/10 on the numeric pain scale in order to improve the ability to perform soft tissue massage.	1. Patient to decrease pain at worst to 2/10 on the numeric pain scale in order to improve bed mobility.
2. Patient will decrease Five-Time-Sit-to-Stand Test times from 49.5 seconds, with use of upper extremities, to 39.5 seconds in order to decrease risk for falls.	2. Patient will require less assistance for bathing, less assistance to put on her socks and shoes, and will use her cane more than her walker to improve the ease of listed ADLs by 50% and decrease burden on caregivers.
3. Patient will increase single leg stance balance to >15 seconds on both left and right lower extremities to decrease risk of falls.	3. Patient will decrease Five-Time-Sit-to-Stand Test times from 49.5 seconds, with use of upper extremities, to <25 seconds to decrease risk of falls.

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490 **Table 4. Detailed Physical Therapy Program**

Intervention	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Manual traction	Long axis distraction of right hip	Long axis and lateral distraction of right hip	Long axis and lateral distraction of right hip		Long axis and lateral distraction of right hip	Long axis and lateral distraction of right hip
Soft tissue massage	Bilateral iliotibial band, deep pressure for 8 minutes	Bilateral iliotibial band, deep pressure for 8 minutes	Bilateral iliotibial band, deep pressure for 10 minutes	Bilateral iliotibial band	Bilateral iliotibial band, deep pressure for 10 minutes	Bilateral iliotibial band
Manual prone rectus femoris stretch	Bilateral rectus femoris, 3 minutes each side		Bilateral rectus femoris, 3 minutes each side			
Bridging	2 sets of 10 reps					
Walking on Toes	6 steps forward and backward, 4 times	6 steps forward and backward, 4 times	6 steps forward and backward, 5 times			
Tandem Stance	4 times for 30 seconds each		5 times for 30 seconds each	5 times for 30 seconds each		
Bouncing Yellow Theraband* ball over head	3 minutes					
Pelvic Circles on Red Theraband* ball	Seated pelvic circles on ball, 10 clockwise and 10 counterclockwise	Seated pelvic circles on ball, 10 clockwise and 10 counterclockwise	Seated pelvic circles on ball, 10 clockwise and 10 counterclockwise	Seated pelvic circles on ball, 10 clockwise and 10 counterclockwise	Seated pelvic circles on ball, 10 clockwise and 10 counterclockwise	Seated pelvic circles on ball, 10 clockwise and 10 counterclockwise
Step Left and Right	6 steps left and 6 steps right, 4 times	6 steps left and 6 steps right, 4 times	6 steps left and 6 steps right, 4 times	6 steps left and 6 steps right, 4 times	6 steps left and 6 steps right, 4 times	6 steps left and 6 steps right, 4 times
Manual Supine Hamstring combined with Adductor Stretch	Bilateral for 3 minutes each side	14 minutes total, 7 minutes on each leg	14 minutes total, 7 minutes on each leg	Bilateral for 3 minutes each side		Bilateral for 3 minutes each side
Bridging	2 sets of 10 reps					

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Standing Psoas Stretch		Bilateral; 4 minutes, 2 minutes each hip				
Double Leg Stance Theraball*Toss		2 sets of 20 catch/toss	2 sets of 20 catch/toss	2 sets of 20 catch/toss		2 sets of 20 catch/toss
Seated Adductor Stretch		3 minutes total, bilaterally splitting time		3 minutes total, bilaterally splitting time	3 minutes total, bilaterally splitting time	
Soccer ball** Kicks	2 sets of 10 reps	Kicking soccer ball for 5 minutes, alternating feet with walking around clinic, 4 minutes	Kicking soccer ball for 5 minutes, alternating feet with walking around clinic, 4 minutes	Kicking soccer ball for 5 minutes, alternating feet with walking around clinic, 4 minutes	Kicking soccer ball for 5 minutes, alternating feet with walking around clinic, 4 minutes	Kicking soccer ball for 5 minutes, alternating feet with walking around clinic, 4 minutes
Medial-Lateral Rock Board Leans Holding Pelvis Level	Medial-Lateral Rock Board Leans Holding Pelvis Level for 5 minutes	Medial-Lateral Rock Board Leans Holding Pelvis Level for 5 minutes	Medial-Lateral Rock Board Leans Holding Pelvis Level for 5 minutes	Medial-Lateral Rock Board Leans Holding Pelvis Level for 5 minutes	Medial-Lateral Rock Board Leans Holding Pelvis Level for 5 minutes	Day 1: Medial-Lateral Rock Board Leans Holding Pelvis Level for 5 minutes
PowerSource*** Speed Agility Ladder	2 sets of 10 reps	6 minutes, side stepping in each box				
Walking on Heels			6 steps forward and backward, 4 times			
Heel taps at stairs			20 heel taps at 7” step	20 heel taps at 7” step		
Sitting on Theraball* kicks with dorsiflexion				10 kicks each leg	10 kicks each leg	10 kicks each leg
Sit to Stand/Return			10 from standard height chair			

491 Blank white box = Intervention was not performed that day

492 HEP = home exercise program

493 * =Theraband (registered trademark), Arkon, OH

494 ** = ADIDAS soccer ball, Herzogenaurach

495 *** = PowerSystems, Knoxville, TN

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