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Restoration Of Functional Mobility For A Young Adult Patient Following A Severe Motor Vehicle Accident: A Case Report

Zachary Mercier
University of New England

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1 **Restoration of Functional Mobility for a Young Adult Patient Following**
2 **a Severe Motor Vehicle Accident: A Case Report**

3

4 Zachary Mercier

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6 Z Mercier, BS, is a Doctor of Physical Therapy student at the University of New England, 716
7 Stevens Ave, Portland, ME 04103

8 Address all correspondence to Zachary Mercier at: zmercier@une.edu

9

10 The patient signed an informed consent form allowing the use of medical information, pictures,
11 and video footage for this report and received information regarding the institution's policies
12 regarding the Health Insurance Portability and Accountability Act.

13

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15 collection and treatment and Amy Litterini PT, DPT for assistance with case report
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17 report process.

18 **ABSTRACT**

19 Background and Purpose: Motor vehicle accidents are a common occurrence causing increased
20 morbidity and possible mortality, thus, increasing lifetime medical costs for those affected. The
21 purpose of this case report is to document the selected patient's response to skilled physical
22 therapy (PT) interventions, ranging from bed mobility tasks to ambulation, following a motor
23 vehicle accident.

24 Case Description: A 20-year-old female was a passenger in a severe motor vehicle versus tree
25 accident with fatalities. The patient suffered multiple fractures throughout her skeleton and spent
26 20 days in a hospital prior to presenting to the skilled nursing facility. Care included high
27 intensity PT interventions five to six days per week for a total of 50 sessions. The patient
28 demonstrated non-compliance with her non-weight bearing (NWB) status of the bilateral lower
29 extremities (BLE).

30 Outcomes: The CARE Items Mobility Assessment score significantly improved from admission
31 to discharge (18/84 to 51/84). The patient demonstrated improvements in bed mobility and
32 functional transfers, as well as strength and endurance. The patient presented to the SNF with
33 non-weight bearing orders for BLE and was discharged with weight bearing as tolerated in BLE,
34 for transfer purposes only.

35 Discussion: Improvements in functional mobility were noted over the course of care. The
36 patient's improved outcomes and increased independence may be due to the prescription of
37 higher intensity PT interventions. Future research should investigate the relationship of
38 appropriate intervention prescription and non-compliance to weight bearing status, decreased
39 motivation, and the effects of NWB status on a patient's ability to regain functional mobility and
40 return to prior level of function.

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42 **BACKGROUND and PURPOSE**

43 The World Health Organization (WHO) reports that over 50 million people world-wide
44 experience non-fatal injuries in motor vehicle accidents (MVA) annually, while 1.2 million
45 individuals die as a result of these accidents.¹ The WHO estimates the rate of road traffic
46 fatalities to be 10.6 per 100,000 people in the United States or a total of 34,064 individuals.¹
47 Unintentional injuries, including MVA, were the leading cause of death in 2014 for females age
48 15 to 24.² Americans spend more than one million days in the hospital each year from motor
49 vehicle crash injuries with the type and severity of injuries suffered varying greatly.³ Lifetime
50 medical costs totaled 18 billion dollars in 2012 as a result of MVA related injuries, with 75% of
51 the costs occurring in the initial 18 months following the injury.³ If a patient is required to stay
52 in a skilled nursing facility (SNF) following a MVA, Jette et al⁴ suggests higher intensity therapy
53 can result in greater gains in functional independence.

54 SNFs generally care for older patients with a wide variety of medical conditions. This
55 case report, describing the rehabilitation of a young adult post MVA in a SNF, was completed
56 due to the uniqueness of the clinical setting. With many interprofessional services available,
57 SNFs are well suited to provide excellent rehabilitation for younger patients, as well as the
58 elderly. However, there is very little literature documenting the rehabilitation outcomes of a
59 young adult following a MVA while receiving physical therapy (PT) in a SNF. Therefore, the
60 purpose of this case report is to document the selected patient's response to skilled PT
61 interventions, ranging from bed mobility tasks to ambulation, in order to return to her prior level
62 of function (PLOF).

63 **CASE DESCRIPTION**

64 **Patient History and Systems Review**

65 The patient agreed to participate in a PT case report after receiving an explanation of the

66 purpose, procedures followed, and the risks and benefits of participating. The patient provided
67 written consent and received a copy of the consent form.

68 The patient was a 20-year-old female presenting to the SNF after a serious motor vehicle
69 versus tree accident with fatalities. She was a passenger in the vehicle and was trapped inside
70 following impact. The patient was hospitalized for 20 days prior to admission to the SNF. She
71 presented with multiple fractures including the left orbital floor, left maxillary sinus, nasal bone,
72 C2 dens fracture, intrarticular fracture involving C2-C3, left ribs 3-7, 10, right ribs 1, 4-6, 8-9,
73 and 11-12 with pneumothorax of right lung, open book pelvic fracture with pronounced diastases
74 and asymmetry, extensive fractures of the sacrum and right acetabulum, left superior and inferior
75 rami fracture, right L5 transverse process fracture, right medial epicondyle avulsion fracture,
76 liver grade 2 trauma, and left planter foot wound. Please refer to Figure 1 for radiographic
77 images of the pelvic fractures.

78 One day after presenting to the emergency department, the patient underwent an external
79 pelvic fixator placement and closure of multiple wounds. Five days after the accident, she
80 underwent a lumbopelvic fusion, sacral laminectomy, and decompression of S1 and S2. A
81 closed anterior pelvic ring reduction and adjustment of the external pelvic fixator was performed
82 ten days following the accident. She presented to the SNF with a cervical soft collar, right knee
83 immobilizer, and pelvic external fixator. The patient was non-weight bearing (NWB) in the
84 bilateral lower extremities (LE) for a total of 71 days post accident. The patient had no other
85 significant past medical history. The patient had an excellent support system including family
86 and friends. She was previously attending community college to become a medical assistant,
87 working part-time, and had been living with her parents at the time of the MVA.

88 She received occupational therapy (OT) and PT services at a SNF. The nursing staff was
89 responsible for wound care and medication management. The patient's chief complaints were

90 pain, decreased global range of motion (ROM) and strength, and NWB status. Please refer to
91 Table 1 for complete results of the systems review. Patient goals included regaining weight
92 bearing (WB) status, becoming independent with all functional mobility, increasing functional
93 activity tolerance, decreasing pain levels, and enhancing overall quality of life in order to return
94 home.

95 **CLINICAL IMPRESSION I**

96 The patient's primary problems included multiple fractures, decreased ROM, joint
97 integrity deficits, decreased functional activity tolerance, abnormal postural alignment, decreased
98 visual acuity, strength impairments, muscle atrophy due to disuse, and pain. These problems are
99 consistent with the patient's condition following the severe MVA. The patient presented with a
100 decrease in functional mobility, pain, increased need for assistance from others, joint instability,
101 decreased skin integrity, and reduced functional activity tolerance indicating the need for skilled
102 PT interventions. Further examination to establish functional limitations and to provide a
103 baseline of impairments included assessments of ROM, muscle strength, pain, and functional
104 mobility. Potential differential diagnoses included peripheral nerve injury in the right lower
105 extremity and various right knee soft tissue injuries including ACL tear.

106 The patient was a good candidate for this case report because of the severity of the
107 injuries suffered in the MVA and the limited literature available on the process of treating a
108 young adult patient in a SNF setting with the significant diagnoses with which she presented.

109 **EXAMINATION – Tests and Measures**

110 A complete initial examination was completed in the patient's room upon admission to
111 the SNF. Pain, sensory integrity, ROM, and muscle strength were assessed. Due to the patient's
112 NWB status at the time of admission, gait analysis and standing examination procedures such as
113 standing balance were not assessed. To assess pain, a verbal numeric pain rating scale (NPRS)

114 was given, with zero being no pain and ten being the worst imaginable pain. The NPRS has
115 adequate test-retest reliability and excellent inter-rater reliability.^{5,6} Sensory integrity was
116 assessed by performing crude touch, as described by O'Sullivan⁷ to the RLE due to patient
117 reported numbness and tingling. There is limited published literature regarding the reliability of
118 sensory testing measures: however, the use of consistent guidelines, administration by skilled
119 examiners, and retests performed by the same individual can help improve reliability.⁷ ROM
120 was assessed using a 12-inch goniometer (Elite Medical Instruments, Fullerton, CA), as
121 described by O'Sullivan⁸ via active and passive movements of bilateral upper and lower
122 extremities in the supine position. ROM measurements assessed with a universal goniometer for
123 extremity joints have excellent reliability.⁸ To improve reliability and validity of goniometric
124 measurements the use of standard positions, proximal stabilization, and use of bony landmarks to
125 align the goniometer should be utilized. At the time of evaluation, the RLE could not be assessed
126 for ROM due to severe pain levels. Upper extremity (UE) and LE muscle strength was assessed
127 in supine using manual muscle testing (MMT) with techniques described by Kendall.⁹ These
128 techniques have demonstrated excellent interrater and intrarater reliability.⁹ Please refer to Table
129 3 for the results of the tests and measures performed.

130 The Continuity Assessment Record and Evaluation (CARE) Item Set, including the
131 mobility assessment portion, was administered at the time of evaluation. This was developed to
132 standardize assessment of patients' medical, functional, cognitive, and social support status
133 across acute and post-acute settings, according to Gage et al.¹⁰ This standardized assessment
134 tool created common language that clinicians can utilize across various sites of care, thus helping
135 improve transfer of information between settings. This assessment tool was developed using the
136 research behind currently mandated Medicare payment system assessment items.¹⁰ Please refer
137 to Table 3 for CARE Item Set results.

138 **CLINICAL IMPRESSION II**

139 Upon examination, the initial clinical impression was confirmed and the patient was
140 determine to be an appropriate candidate to receive skilled PT services at the SNF. The primary
141 medical diagnosis assigned to this patient was multiple fractures of the pelvis with unstable
142 disruption of the pelvic ring (ICD-10 S32.811A) and the primary physical therapy diagnosis was
143 generalized muscle weakness (ICD-10 M62.81). The patient continued to be an appropriate
144 candidate for this case report due to her continued need for skilled interventions to address the
145 above stated impairments in order to prepare for future ambulation and enhance the patient's
146 quality of life. The patient demonstrated excellent rehabilitation potential as evidenced by high
147 PLOF and strong family support, thus making her a good candidate for this case report.

148 The patient continued to receive skilled OT skilled interventions to address impairments
149 in activities of daily living (ADL) performance, safety awareness, self care, and UE ROM and
150 strength. The plan of care (POC) included coordination and communication with OT, attending
151 nurses, and various medical professionals including general practitioners, neurologists and
152 orthopedic surgeons. Patient and family education was provided regarding the patient's
153 condition, progress in therapy, activity limitations, interventions, reduction of risk factors, and
154 safety concerns. The prescribed skilled PT interventions addressed physical impairments and
155 were progressed appropriately throughout the treatment period. A focus was placed on
156 prescribing the appropriate intensity of various therapeutic interventions in order to improve
157 functional independence and decrease the patient's length of stay, as a relationship of greater
158 intensity resulting in improved outcomes was suggested by Jette et al.⁴ Short-term and long-term
159 goals were discussed with and agreed upon with the patient and can be found in Table 4. Goals
160 were appropriately upgraded or downgraded depending on patient response to therapeutic
161 interventions every 10 days. Upon discharge, the patient was to be referred to outpatient PT to

162 continue to address impairments with functional mobility in order to return to PLOF.

163 **INTERVENTIONS**

164

165 Coordination, Communication, and Documentation

166

167 Open communication was maintained among all treating therapists during the patient's
168 episode of care, including physical and occupational therapists and assistants. Treatment times
169 were coordinated in order to facilitate optimal patient participation and reduce the risk of patient
170 fatigue. Areas of concern outside of the scope PT practice, such as determining WB status, were
171 discussed with the nursing staff and attending physicians, as appropriate. Communication with
172 family members was routinely conducted for updates regarding the patient's progress in
173 therapeutic interventions and to avoid scheduling conflicts with various medical appointments
174 requiring transportation off site. In addition to the patient's initial evaluation, progress reports,
175 and discharge summary documented in the facilities electronic medical record system,
176 documentation was completed daily using a paper treatment flow sheet, including the
177 interventions performed, patient response to treatment, and any additional communication that
178 was pertinent to providing optimal care.

179 Patient/Client Related Instruction

180 Patient education was initially focused on performing the prescribed interventions in order to
181 prepare for future ambulation and to maintain a level of muscle strength during the NWB stages
182 of the patient's recovery. Education topics changed to adherence to WB status, appropriate body
183 mechanics, and purpose of skilled intervention as the patient's WB status was altered throughout
184 the recovery. Education topics throughout the patient's time in therapy included the benefits of
185 eating a healthy diet including sufficient caloric intake and protein consumption, proper
186 hydration, the healing processes, and purpose of eccentric and concentric control of muscles

187 during therapeutic exercises. The patient and their family were educated throughout regarding
188 the POC and the appropriate progressions as the patient's medical status improved.

189 Procedural Interventions

190 Procedural interventions were prescribed based on the patient's physical, cognitive, and
191 emotional impairments. Interventions included therapeutic exercise, therapeutic activities, gait
192 training, and wheelchair management, as illustrated in Table 4. Therapeutic exercises were
193 prescribed to increase muscle strength, coordination, and motor control. Therapeutic activities
194 were prescribed in order to facilitate improvements in the patient's ability to participate in
195 activities such as bed mobility, functional transfers, and functional activities such as ADLs. Gait
196 training was prescribed in order to facilitate a normalized gait pattern, teach and instruct in
197 proper assistive device use, and increase independence with mobility. Wheelchair management
198 interventions were prescribed in order to facilitate independence with wheelchair mobility in the
199 SNF and the community including proper transfer technique and safety. Refer to Table 4 for a
200 detailed outline of the procedural interventions.

201 Interventions initially focused on maintaining the patient's muscle strength during the NWB
202 period of healing, as well as increasing the patient's tolerance to new positions. Therapeutic
203 exercises initiated during the NWB stage isolated muscle activity and taught the patient how to
204 control specific motions. Many functional activities, such as the swing phase of gait and car
205 transfers, have NWB components, thus making these interventions advantageous.¹¹
206 Interventions also included introducing the patient to new positions such as sitting in her
207 wheelchair and at the edge of her bed. The goal was to increase her tolerance to more upright
208 and functional positions. A focus was also placed on functional transfers, which included a slide
209 board transfer to and from her wheelchair to various surfaces. The ability to transfer from a
210 seated or supine position to another surface or to the standing position is an essential skill that

211 must often be relearned following an injury.¹² This was important to facilitate independence
212 with transfers as the patient initially required a maximum assistance of five staff members for
213 safe transfers to and from bed. Therapeutic exercises, including ROM and strengthening
214 exercises, were appropriately progressed as the patient demonstrated increased strength and
215 endurance with the prescribed interventions. See Table 4 for a description of exercise
216 parameters. Three sets of 15-20 repetitions is considered an appropriate parameter for resistance
217 training as it contributes to increased muscular endurance, muscle memory, and improved
218 functional performance.¹³

219 Wheelchair management interventions were prescribed to increase the patient's independence
220 within the facility. The ability to propel and maneuver around obstacles in the facility and in the
221 community was essential to the patient's functional independence.¹⁴ Once the patient
222 demonstrated the ability to tolerate an upright position in the wheelchair during week three, the
223 wheelchair management techniques and interventions became an independent skill with limited
224 verbal cues required for proper techniques and safety.

225 Interventions in weeks five through seven focused on the patient's strength and endurance as
226 her weight bearing status progressed. A continued focus was placed on increasing the patient's
227 tolerance to new positions such as standing and anti-gravity ambulation. During week five, the
228 patient was introduced to the SCIFIT Pro1000 Upper Body machine (SCFIT Corporation, Tulsa,
229 OK) to begin to increase her heart rate in preparation for future ambulation and aerobic activities.
230 On treatment day 37, the patient received updated WB orders which included weight bearing as
231 tolerated (WBAT) in the left lower extremity (LLE) and toe-touch WB in the right lower
232 extremity (RLE). After receiving the updated WB orders, a focus was placed on increasing the
233 patient's independence with functional transfers including stand/pivot and sit-to-stand transfers to
234 various surfaces. A focus was also placed on increasing the patient's tolerance to the standing

235 position; this was accomplished using the parallel bars for UE support. To address the patient's
236 decreased endurance and strength, a NuStep recumbent cross trainer (NuStep Inc., Ann Arbor,
237 MI) was utilized as it is designed to provide a full-body cardio and strength workout with low
238 impact.¹⁵ The patient was required to use all extremities except for the RLE due to WB orders.
239 The length of time the patient exercised on both the NuStep and SCIFIT Pro1000 was
240 appropriately progressed based on patient's response, measured by reported level of difficulty,
241 and verbalized soreness levels. On treatment day 44, the patient received a WB order of WBAT
242 for bilateral LEs for transfer purposes only. The patient's physician also cleared the patient for
243 anti-gravity treadmill training and pool therapy at this time. The AlterG Anti-Gravity Treadmill
244 M320 (AlterG, Inc., Fremont, CA) was utilized for gait training while following WB orders. The
245 AlterG treadmill has many therapeutic uses including gait training and strengthening following
246 injury. This treadmill provided a fall-safe environment with reduced patient discomfort and risk
247 for injury for gait training while adhering to the patient's WB orders.¹⁶ The patient was
248 discharged, from the SNF, prior to receiving full WB orders for ambulation and functional
249 activities.

250 **OUTCOME**

251 The patient was able to increase her independence in all aspects of functional mobility,
252 having started in a physically dependent state. She gradually achieved her established
253 therapeutic goals; however, she was unable to achieve goals for gait due to her WB status at the
254 time of discharge. Significant improvement was noted in the CARE Items Mobility Assessment
255 Score; at admission her score was 18/84 and at discharge her score improved to 51/84. Table 3
256 represents a comparison of the patient's functional outcomes at admission and discharge. She
257 was independent with all bed mobility tasks and modified independent with all functional
258 transfers at discharge. She demonstrated the ability to propel her wheelchair independently for

259 unlimited community distances.

260 At discharge, the patient continued to be non-ambulatory due to physician orders for
261 WBAT for transfer purposes only. However, she was able to demonstrate increased functional
262 activity tolerance by walking up to 25 minutes in the AlterG. The patient made excellent
263 progress toward achievement of her goals. She was limited by her non-ambulatory status, pain,
264 non-compliance with WB orders, and decreased motivation to participate in skilled interventions.
265 She was discharged to home with her parents in order to continue skilled PT in an outpatient
266 setting.

267 **DISCUSSION**

268 Functional mobility gains were noted throughout the course of care. The patient
269 progressed from a dependent functional status to a modified independent to independent level of
270 function depending on the functional mobility task. She demonstrated improvements in bed
271 mobility tasks and functional transfers, along with improved strength and functional activity
272 tolerance. It is possible the patient's improved outcomes and increased levels of independence
273 were a result, at least in part, of the consistent and appropriate progression of skilled
274 interventions during daily PT at the SNF. After 10 weeks and 4 days of skilled PT, the patient
275 was discharged home with physician orders for WBAT in bilateral LE for transfer purposes only.
276 She achieved a 51/84 on the CARE Items Mobility Assessment and plateaued with functional
277 mobility progression due to her WB status. It was suggested that the patient would benefit from
278 outpatient PT services to continue to address her functional limitations in order to return to her
279 PLOF. Contributing factors to the patient's discharge status included non-ambulatory status,
280 pain, non-compliance with WB status, and decreased motivation to participate in skilled
281 interventions. The severity of the patient's injuries, non-compliance to WB orders, and
282 decreased motivation to participate in skilled PT may have reduced her potential for

283 improvement in functional mobility.

284 Jette et al⁴ examined the relationship between therapy intensity and length of stay (LOS)
285 at a SNF which revealed that higher intensity therapy was associated with a decreased LOS.
286 Better outcomes in this study were related to decreased LOS and functional improvements for
287 patients who had a variety of conditions, including orthopedic diagnoses. This study
288 demonstrated the importance of prescribing the appropriate interventions for this individual
289 patient in order to provide optimal PT services. Appropriate intervention prescription is just one
290 aspect of patient centered care. While the patient in this case report responded well to the
291 progressive intervention program, the previously stated factors limited her improvements
292 returning to her PLOF. Due to these factors, the patient was unable to achieve all of her
293 therapeutic goals and was referred to outpatient PT services to continue to address her functional
294 limitations.

295 In conclusion, patients who experience traumatic injuries due to MVAs present with
296 significant functional mobility impairments. An important aspect to their return to PLOF may be
297 appropriate skilled PT intervention prescription. However, a variety of factors may also play a
298 role in their recovery including motivation, WB status, and family/caregiver support. This case
299 report suggests that SNFs are appropriate settings for providing optimal, patient-centered care for
300 young adult patients in addition to elderly patients. Further research should investigate the
301 relationship of therapeutic interventions and the various contributing factors and their effect on a
302 patient's ability to regain their functional mobility and return to PLOF.

303

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351

352 **TABLES and FIGURES**

Table 1: Systems Review	
Cardiovascular/Pulmonary	Impaired
	Edema present in bilateral lower extremities
Musculoskeletal	Impaired
	Right lower extremity range of motion limited by severe pain.
	Right lower extremity strength not tested due severe pain levels.
	Left lower extremity range of motion was within functional limits
	Right and left upper extremity range of motion was within normal limits.
Neuromuscular	Impaired
	Numbness and tingling present in right foot along with sharp, burning pain.
Integumentary	Impaired
	Multiple lacerations and scarring throughout bilateral upper and lower extremities and face.
Communication	Unimpaired
Affect, Cognition, Language, Learning Style	Unimpaired

353

354

355

Table 2: Medications			
Admission	Use	Discharge	Use
Acetaminophen	pain management	Acetaminophen	pain management
Bacitracin ophthalmic	treatment of superficial ocular infection	Dilaudid	pain management
Bacitracin topical	prevention of infection in minor cuts/scrapes/burns		
Bisacodyl	temporary relief of occasional constipation		
Cefpodoxime	treatment of infections caused by <i>S. aureus</i>		
Docusate	stool softener		
Enoxaparin	prevention of deep vein thrombosis prophylaxis		
Hydrocortisone topical	relief of inflammatory and pruritic manifestations of corticosteroid-responsive dermatoses		
HYDROMorphone	pain management		
Lidocaine topical	temporary relief of localized pain		
Naproxen	relief of mild-to-moderate pain		
Notriptyline	N/A		
Ondansetron	prevention of post-operative nausea		
oxyCODONE	management of acute or chronic moderate to severe pain		
Polyethylene glycol	treatment of occasional constipation		
Senna	short-term treatment of constipation		
traZODone	treatment of major depressive disorder		

356 Table 2: Clinical uses accessed via *Access Pharmacy*

357

358

Table 3: Tests and Measures		
Examination Measure	Admission	Discharge
Pain (Numeric Pain Rating Scale):		
At rest	8/10 (constant; right LE and pelvis; sharp/aching)	1/10 (intermittent; right LE; sharp/aching)
With Movement	9/10 (intermittent; right LE and pelvis; sharp/aching)	2/10 (intermittent; right LE; sharp/aching)
Sensory Integrity:		
Crude Touch (RLE)	Decreased sensation in the superficial peroneal and sural nerve distributions.	Decreased sensation in the superficial peroneal and sural nerve distributions.
Range of Motion (ROM):		
UE ROM	RUE: WNL LUE: WNL	RUE: WNL LUE: WNL
LE ROM	RLE: patient unable to tolerate PROM or AROM in any plane of motion LLE: WFL	RLE: WFL LLE: WFL
Muscle Strength (Manual Muscle Testing):		
UE strength	RUE: 5/5 LUE: 5/5	RUE: 5/5 LUE: 5/5
LE strength	RLE: DNT LLE: WFL	RLE: 3/5 LLE: 4/5
CARE Items Mobility Assessment Score		
Total Score	18/84	51/84
Basic Mobility		
Lying to Sitting on Side of Bed	Dependent	Independent
Sit to Lying	Dependent	Independent
Rolling Left & Right	Maximal Assistance	Independent
Sit to Stand	Dependent	Setup/cleanup assistance
Chair or Bed to Chair Transfer	Dependent	Setup/cleanup assistance
Toilet Transfer	Dependent	Setup/cleanup assistance
Locomotion - Walking		
Walking Distance (ft.)	DNT	DNT
Walking - Level of Assistance	Dependent	Dependent
Locomotion - Wheeling		
Wheeling Distance (ft.)	DNT	>= 150 feet
Wheeling - Level of Assistance	Dependent	Independent
Additional Mobility		
Picking Up Objects	Dependent	Setup/cleanup assistance
Car Transfer	Dependent	Setup/cleanup assistance
Walking 50 ft. with 2 Turns	Dependent	Dependent

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Walking 10 ft. on Uneven Surface	Dependent	Dependent
Taking 1 Step or Curb	Dependent	Dependent
Taking 4 Steps with or without Rail	Dependent	Dependent
Taking 12 Steps with or without Rail	Dependent	Dependent

Table 3: UE: upper extremity; LE: lower extremity; DNT: did not test; WFL: within functional limits; WNL: within normal limits; NPRS: numeric pain rating scale; ft: feet

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Table 4: Short and Long Term Goals			
Short-term Goals (2 weeks)	Goal Met	Long-term Goals (10 weeks)	Goal Met
Patient will position and reposition self in bed with minimal assistance with use of positioning devices in order to decrease pain, in order to enhance comfort, and in order to facilitate intact skin integrity.	After 10 Rx sessions	Patient will safely perform bed mobility tasks with independence without use of side-rails in order to get in/out of bed.	After 40 Rx sessions
Patient will increase ability to sit supported in wheelchair for 30 minutes without adaptive equipment/devices, without falls, and with stable vital signs in order to increase safety with mobility tasks.	After 40 Rx sessions	Patient will safely perform functional transfers with minimal assistance without falls, while maintaining weight-bearing precautions, and without dizziness in order to safely return to private residence with reduced risk for falls.	After 51 Rx sessions
Patient will roll side to side in bed with modified independence using siderails in order to decrease risk of skin breakdown.	After 20 Rx sessions	Patient will safely ambulate 200 feet using a front wheeled walker on level and uneven surfaces with modified independence without falls and with stable vital signs in order to return to prior living and supervision levels.	Discontinued after 51 Rx sessions
Patient will increase ability to sit unsupported on compliant surfaces for 1 hour with minimal pain without adaptive equipment/devices in order to increase safety with mobility tasks.	After 50 Rx sessions	Patient will be able to stand for five minutes with minimal complaints of pain to improve independence with ADLs and functional mobility.	After 50 Rx sessions
Patient will safely perform functional transfers with modified independence without falls and without loss of balance in order to increase performance skills with functional tasks and adhere to weight bearing precautions.	After 51 Rx sessions		
Patient will safely ambulate on level surfaces 50 feet using front wheeled walker with contact guard assistance with functional dynamic balance and with continuous steps 100% of the time without loss of balance to increase independence with all functional ambulation and adhering to weight bearing precautions.	Discontinued after 51 Rx sessions		

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Table 5: Procedural Interventions			
	Week 1 (Rx 1-7)	Week 2 (Rx 8-14)	Week 3 (Rx 15-21)
Gait	N/A	N/A	N/A
Bed Mobility	<ul style="list-style-type: none"> Rolling Scotting Level of Assist: Min (A) rolling to (L) only 	<ul style="list-style-type: none"> Trapeze scotting Level of Assist: Independent 	<ul style="list-style-type: none"> Independent rolling/scotting
Functional Transfers	<ul style="list-style-type: none"> Bed to/from wheelchair Level of Assist: Max (A) x 5 	<ul style="list-style-type: none"> Bed to/from wheelchair Level of Assist: Max (A) x 5 	<ul style="list-style-type: none"> Bed to/from wheelchair with slide board Wheelchair to/from commode with slide board Level of Assist: Supervision
Supine/Seated/ Standing Ther-Ex	<p>Supine</p> <ul style="list-style-type: none"> AAROM AROM LLE 2# ankle weight: SLR, heel slides, ankle pumps, SAQ RLE & LLE quad sets RLE & LLE glute squeezes <p>3 sets of 15-20 repetitions with supine rest breaks between each set</p>	<p>Supine</p> <ul style="list-style-type: none"> LLE 2.5# ankle weight: SLR, heel slides, ankle pumps, SAQ, hip abduction/adduction RLE & LLE quad sets RLE & LLE glute squeezes RLE hip and knee PROM RLE hip flexion and abduction/adduction with slide board <p>4 sets of 15-20 repetitions with supine rest between sets</p> <p>Seated</p> <ul style="list-style-type: none"> EOB for 20 minutes 	<p>Supine</p> <ul style="list-style-type: none"> RLE: SLR, heel slides, ankle pumps, SAQ, hip abduction/adduction RLE & LLE: quad sets and glute squeezes <p>RLE ther-ex: 2 sets of 15 repetitions with rest between sets LLE ther-ex: 2 sets of 15 repetitions with rest between sets</p> <p>Seated:</p> <ul style="list-style-type: none"> LLE: LAQ, hip flexion, ankle pumps (2 sets of 15-20 repetitions) Supported EOB for up to 55 min Seated EOB abdominal crunch (3 sets of 20 repetitions)
Wheelchair Sitting Tolerance	<ul style="list-style-type: none"> 30 minutes with minimal dizziness 	<ul style="list-style-type: none"> HOB elevated with UE reaching task for 15 minutes Seated ~70 degrees up to 2 hours 	<ul style="list-style-type: none"> Seated ~70 degrees up to 4 hours
Wheelchair Mobility		<ul style="list-style-type: none"> Self propel ~120 feet 	<ul style="list-style-type: none"> Self propel up to 500 feet

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Table 5: Procedural Interventions, continued			
	Week 4 (Rx 22-28)	Week 5 (Rx 28-35)	Week 6 (Rx 35-42)
Gait	N/A	N/A	
Bed Mobility	<ul style="list-style-type: none"> Independent rolling/scooting 	<ul style="list-style-type: none"> Independent 	<ul style="list-style-type: none"> Independent
Functional Transfers	<ul style="list-style-type: none"> Bed to/ from wheelchair with slide board Level of Assist: Modified Independence 	<ul style="list-style-type: none"> Bed to/ from wheelchair with slide board Wheelchair to/from car with slide board Level of Assist: Modified Independence 	<ul style="list-style-type: none"> Sit to stand Stand/pivot with FWW Level of Assist: Contact guard to supervision
Supine/Seated/ Standing Ther-Ex	Seated <ul style="list-style-type: none"> RLE 2# ankle weight, LLE 3# ankle weight: LAQ, hip flexion, hip abduction, hamstring curls Abdominal crunches and rotations with 3.3# medicine ball 3 sets of 15-20 repetitions with rest breaks between each set	Seated (edge of mat) <ul style="list-style-type: none"> BLE 5# ankle weight: LAQ, hip flexion Abdominal crunches and rotations with 3.3# medicine ball 3 sets of 15-20 repetitions with rest breaks between each set	<ul style="list-style-type: none"> Standing tolerance in parallel bars (up to 12 minutes) Rest breaks provided based on patient fatigue level and tolerance to standing position.
Wheelchair Sitting Tolerance	<ul style="list-style-type: none"> Unlimited time in wheelchair ~80-90 degrees 	<ul style="list-style-type: none"> Unlimited time in wheelchair ~80-90 degrees 	<ul style="list-style-type: none"> Unlimited time in wheelchair ~80-90 degrees
Wheelchair Mobility	<ul style="list-style-type: none"> Unlimited level surface propulsion 	<ul style="list-style-type: none"> Unlimited level surface propulsion 	<ul style="list-style-type: none"> Unlimited level surface propulsion
SCIFIT Pro 1000	N/A	<ul style="list-style-type: none"> Quick start setting, Level 9.5 for 20 min 	N/A
NuStep Recumbent Trainer	N/A	N/A	<ul style="list-style-type: none"> Level 5 for 15 min

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Table 5: Procedural Interventions, continued	
	Week 7 (Rx 43-50)
Gait	<ul style="list-style-type: none"> Alter G settings: 40% body weight, 0.5-1.3 mph, 15-25 minutes
Bed Mobility	<ul style="list-style-type: none"> Independent
Functional Transfers	<ul style="list-style-type: none"> Sit to stand Stand Pivot Level of assist: supervision to modified independence with FWW
Supine/Seated/ Standing Ther-Ex	<ul style="list-style-type: none"> Standing Tolerance in parallel bars 1 set for 7 minutes with weight shifting as appropriate Parallel bars: body weight squats 3 sets of 10 with wheelchair located behind patient for tactile feedback. Rest breaks between each set.
Wheelchair Sitting Tolerance	<ul style="list-style-type: none"> Unlimited time in wheelchair ~80-90 degrees
Wheelchair Mobility	<ul style="list-style-type: none"> Unlimited level surface propulsion
SCIFIT Pro1000	N/A
NuStep Recumbent Trainer	<ul style="list-style-type: none"> Level 7 for 20 min.

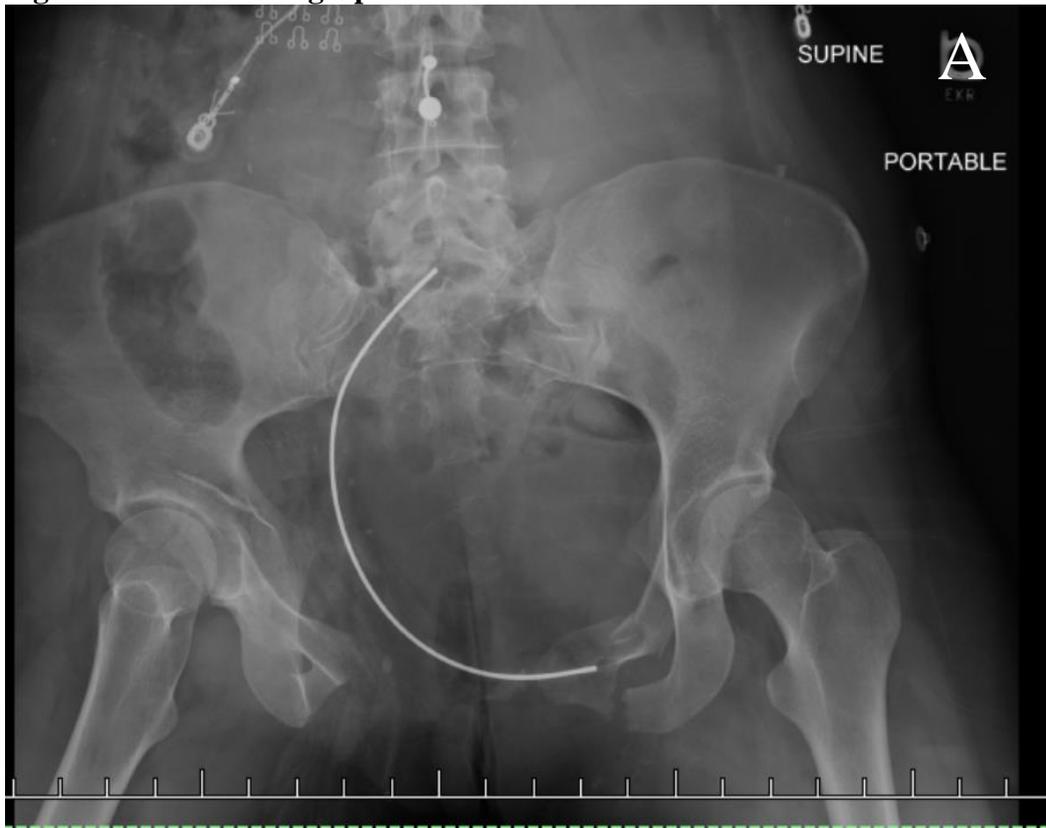
Table 5: Ther-ex: therapeutic exercises; N/A: not applicable; AAROM: active assisted range of motion; LLE: left lower extremity; RLE: right lower extremity; #: pound; SLR: straight leg raise; SAQ: short arc quads; HOB: head of bed; EOB: edge of bed; LAQ: long arc quad; Rx: Treatment; (A): assistance; UE: upper extremity; AROM: active range of motion; FWW: front wheeled walker; BLE: bilateral lower extremity

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Figure 1: Pelvic Radiographs



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Mercier, Restoration of Functional Mobility for a Young Adult Patient Following Severe Motor Vehicle Accident: a Case Report



384 Figure 1 Radiographs (Reproduced with permission: VCUHS Radiology Department):
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386 A. The radiograph demonstrates a Foley catheter in place projecting over the pelvis. A comminuted left superior and inferior pubic rami
387 fractures, pubic symphysis diastases, comminuted right acetabular and bilateral sacral ala fractures are demonstrated. A displaced fracture of the
388 right L5 transverse process is also pictured, denoting an unstable vertical shearing injury to the pelvis. B. Patient was status post external fixation
389 of the pelvis with screws traversing the right and left iliac bone. Multiple pelvic fractures are demonstrated including comminuting fractures of
390 bilateral sacrum, right acetabulum, right symphysis pubis, left superior and inferior pubic rami, and diastasis of the pubic symphysis is noted. C.
391 X-ray taken 77 days post MVA. This radiographic image of the pelvis demonstrates healing of the previously stated fractures and the internal
392 fixator.