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# Case Study: Acute and Subacute Physical Therapy Management of Patient with Multiple Orthopedic Injuries and a Mild Brain Injury Resulting from Motorcycle Collision

Leah Jensen  
*University of North Dakota*

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CASE STUDY: ACUTE AND SUBACUTE PHYSICAL THERAPY  
MANAGEMENT OF PATIENT WITH MULTIPLE ORTHOPEDIC INJURIES AND  
A MILD BRAIN INJURY RESULTING FROM MOTORCYCLE COLLISION

by

Leah Jensen  
Bachelor of Science, University of North Dakota, 2016

A Scholarly Project Submitted to the Graduate Faculty of the

Department of Physical Therapy  
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In partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

Grand Forks, North Dakota

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

A handwritten signature in black ink, appearing to read "M. R. Smith", written over a horizontal line.

(Graduate School Advisor)

A handwritten signature in black ink, appearing to read "David R. Kelly", written over a horizontal line.

(Chairperson, Physical Therapy)

## PERMISSION

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**Department** Physical Therapy

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## TABLE OF CONTENTS

LIST OF TABLES .....	v
ABSTRACT.....	vi
CHAPTER	
I.    BACKGROUND AND PURPOSE.....	1
II.   CASE DESCRIPTION.....	4
Examination and Evaluation .....	5
Diagnosis, Prognosis, and Plan of Care.....	9
III.  INTERVENTIONS.....	12
IV.  OUTCOMES.....	15
V.   DISCUSSION.....	18
VI.  CONCLUSION.....	20
APPENDIX .....	21
REFERENCES .....	24

## LIST OF TABLES

### Table

1. Mobility Levels with Descriptor and Intervention Example.....	2
2. Ratings of TBI Severity and Concussion Grading Systems.....	6
3. Initial Mobility Examination Results.....	7
4. Initial General Range of Motion Result .....	8
5. Discharge Mobility Examination at 3.5 Weeks Results.....	16
6. Discharge General Range of Motion on Results.....	16

## ABSTRACT

**Background and Purpose.** This case report describes the 3.5-week inpatient physical therapy management of an 18-year-old female involved in a motorcycle accident resulting in multiple orthopedic injuries, a mild brain injury, and multiple skin abrasions. She was non-weight bearing (NWB) with her bilateral upper extremities, toe-touch weight bearing (TTWB) on her right lower extremity, and weight bearing as tolerated (WBAT) on her left lower extremity throughout the course of her treatment. The purpose of this case report is to describe the various physical therapy (PT) interventions utilized for this patient and the patient's status after completion of them.

**Case Description.** The treatment of this patient involved bed mobility, balance activities, transfers, stretching, range of motion, therapeutic exercise, wheelchair mobility, and a variety of patient and family education.

**Outcomes.** Although we cannot conclude the patients accomplishments were influenced by our physical therapy management, at discharge she showed improvements in her 6-clicks functional measurement assessment score, bed mobility, transfers, wheelchair mobility, strength, range of motion (ROM), and pain.

**Discussion.** Rationale for treatment was based on literature supporting the importance of early and continued hospital mobilization to decrease length of

stay and maximize functional mobility for safe discharge. Treatment was altered or progressed based on the patient's symptoms and/or treatment response.

Key words: Multiple orthopedic injuries, non-ambulatory, pain, physical therapy



## CHAPTER I

### BACKGROUND AND PURPOSE

Early mobility is an important factor in reducing hospital-acquired pressure ulcers, shortening length of stay, and lowering readmission rates.<sup>1</sup> This was especially important to this patient, because her initial evaluation resulted in her scoring a 12 on the Braden Pressure Ulcer Risk Assessment, putting her at high risk of developing a pressure ulcer. The prevalence of pressure sores among inpatients has been shown to range between 3.75% and 42% in various settings.<sup>2,3</sup> We utilized the Braden scale because it has been shown to offer the best balance between sensitivity (57.1%) and specificity (67.5%), the highest inter-rater reliability (Pearson's  $r$ : 0.83–0.99), and the best effectiveness score (odds ratio = 4.08, CI 95% = 2.56–6.48) in comparison to the Norton scale, Waterlow scale, and clinical judgement.<sup>4</sup> A study by Azuh et al<sup>1</sup> implemented a 5-point mobility scale that was developed and used to establish a patient's highest level of activity achievable during evaluation, and each level has a corresponding plan of care (intervention) that was followed and adjusted according to the patient's progress and nursing evaluation. After one year of employing the mobility team, there was a statistically significant decrease in the medical intensive care unit (MICU) hospital-acquired pressure ulcer rate to 6.1% ( $P = .0405$ ). Hospital readmission of MICU patients also significantly decreased

from 17.1% to 11.5% ( $P = .0010$ ). The mean MICU length of stay decreased by one day. There were no safety issues directly or indirectly associated with these interventions. Our patient achieved mobility levels 1 through 3, but was unable to complete levels 4 and 5 due to her inability to walk. Refer to Table 1 for the mobility levels with descriptor and intervention examples. Additionally, due to this patient's limited mobility she was at risk of deconditioning. A study by Gruther et al<sup>5</sup> measured muscle layer thickness of the quadriceps femoris using ultrasound measurement in intensive care unit (ICU) patients. Quadriceps femoris thickness showed a significant negative correlation with length of stay in the ICU ( $p < 0.01$ ). It demonstrated that loss of muscle mass negatively correlates with length of stay and seems to be higher during the first 2 to 3 weeks of immobilization/intensive care unit stay. With this patient we followed her skin status relative to her mobility during her hospital stay.

Mobility Level	Description	Common Interventions for Each Mobility Level*
1	Bed rest	Reposition every 2 h and as needed. Range of motion based on restrictions every 4 h.
2	Edge of the bed	Up to 3 times per day for 5-30 min. Initiate assisted or active exercises.
3	Stand to chair	Up in chair 3 times per day for 30 min.
4	Walk with assistance	Up in chair for all meals and walk 3 times per day with assistance.
5	Walk independently	Up in chair for all meals and walk 3 times per day.

This case report is important because it illustrates application of the theory that there is minimal risk to mobilizing critically ill patients once hemodynamic stability is achieved, and it supports the literature that when mobilization and PT/occupational therapy (OT) sessions are emphasized in the acute care setting, time to mobility milestones can be reduced and patient participation in advanced mobilization activities occurs more frequently.<sup>6</sup>

## CHAPTER II

### CASE DESCRIPTION

#### History

The patient was an 18-year-old female who was the passenger riding without a helmet on a motorcycle going over 80 mph when it rear-ended another vehicle. The patient had a loss of consciousness (LOC) with the initial crash but was alert and screaming in pain and shock when emergency medical personnel arrived. She also suffered the following fractures from the accident: right orbital, right sinus, right acetabular, right iliac wing, right tibia-fibula open grade I to II, right olecranon, right 3<sup>rd</sup> metacarpal, skull base, and left distal radial shaft and styloid. The only significant past medical history included anxiety with panic attacks, otherwise she was a healthy teenager. Prior to the accident the patient was independent in bed mobility, transfers, stairs, gait, and was a community ambulator. She was alternating weekly between staying at her mother's home and her father's home because they were divorced. The patient dropped out of high school a few months prior to the accident, so she was not attending school. However, she was working three fast-food jobs which required a lot of time on her feet. She was not involved in any activities and she did not have specific hobbies but did report spending most of her free time socializing with friends. The patient was uninsured, but her father was willing and able to pay for any and all

of the care she required. The patient was admitted to the ICU after the accident and was intubated and sedated for two days. The majority of her fractures were surgically fixed on Days 4 through 8 resulting in weight bearing statuses of NWB bilateral upper extremities, TTWB right lower extremity, and WBAT left lower extremity throughout the course of her treatment. Once cleared from bedrest by her medical doctors on Day 8 she was seen by an inpatient acute care physical therapist on the orthopedic medical/surgical floor for an initial evaluation. The patient's main goals included decreasing her pain and returning home as soon as possible.

#### Examination and Evaluation

Upon initial observation the patient was supine in bed with right and left wrist/forearm splints and a left leg splint. Her vital signs were all stable and she had a peripherally inserted central catheter (PICC) line and blood transfusion line. The patient rated her pain a 10/10 at rest during the initial evaluation and reported her chief complaints to be pain in the right hip, leg, and elbow, as well as left wrist pain and bilateral foot pain. While communicating with her she had a mildly difficult time focusing her attention, was intermittently drowsy, exhibited symptoms of depression, complained of a headache, exhibited retrograde amnesia by being unable to recall events leading up to her accident and the accident itself, and was also unmotivated. According to the Traumatic Brain Injury (TBI) rating scale described by Esselman and Uomoto<sup>7</sup> the patient suffered a mild TBI because her initial Glasgow Coma Scale score was a 14 and she had

a loss of consciousness (LOC) for less than 30 minutes. Refer to Table 2 for the TBI rating scale and concussion grading systems.

Table 2. Ratings of TBI Severity and Concussion Grading Systems <sup>7</sup>		
Mild	Moderate	Severe
GCS = 13–15	GCS = 9–12	GCS ≤ 8
PTA ≤ 1 h	PTA = 1–24 h	PTA = >1 day
LOC < 30 min	LOC = 30 min–24 h	LOC > 24 h
GCS Glasgow Coma Scale, PTA length of posttraumatic amnesia, LOC length of loss of consciousness		

During examination of the patient’s mobility she was extremely anxious and fearful. She cried out in pain with subtle movements. She required maximal verbal cues to keep her eyes open, for proper body/limb placement, and for encouragement. Refer to Table 3 for initial mobility results. Due to acuity of her injuries and recent surgeries the patient’s initial strength and range of motion examination was deferred. Her strength and ROM were assessed one week after her initial examination and the results are documented below.

Lower extremity: right hip, knee and ankle strength and ROM not assessed due to injuries. Strength was tested in supine with resisted isometrics for left hip flexion, extension, abduction, adduction, internal rotation, and external rotation revealing 5/5 manual muscle test (MMT) grades. Left knee flexion and extension, as well as left ankle plantarflexion and dorsiflexion, also revealed MMT grade 5/5 for all motions.

Upper extremity: bilateral shoulder ROM, right wrist, and left elbow within normal limits (WNL). Right elbow and left wrist ROM were assessed as moderately impaired. Strength was not assessed with the elbows or wrists due to injuries. Bilateral shoulder strength was tested in supine with resisted isometrics in all directions yielding 5/5 MMT grades. No formal goniometric measurements were taken but refer to Table 4 for initial general range of motion results.

The patient's problem list included pain, impaired cognition, decreased range of motion, decreased strength, limited functional mobility, nonambulatory, dependent, and at risk for skin breakdown and deconditioning. All of these factors had an influence on the patient's status and were addressed appropriately in our plan of care.

Table 3. Initial Mobility Examination Results		
Activity	Assistance	Assistive Device
Rolling	Max PA, 3 person assist	
Sit-Supine	Max PA, 3 person assist	Comfort glide sheet
Supine-Sit	Max PA, 2 person assist	Comfort glide sheet
Static Sitting Balance	Min PA, 1 person assist	
Dynamic Sitting Balance	Not assessed	
Midline Orientation	Min PA, 1 person assist	
Transfers	Not assessed	
Ambulation	Non-ambulatory due to injuries/weight bearing status	
Wheelchair Mobility	Not assessed	
Stairs	Not assessed	

Table 4. Initial General Range of Motion Results:				
Joint	ROM Within Normal Limits	Min ROM Impairment	Mod ROM Impairment	Max ROM Impairment
L Hip, Knee, Ankle	X			
L Shoulder, Elbow	X			
L Wrist			X	
R Hip, Knee, Ankle				X
R Shoulder, Wrist	X			
R Elbow			X	

Throughout her hospital stay she was administered medications such as pain relievers, diuretics, anti-depressants, anti-anxiety, and corticosteroid medications. These drugs have potential side effects such as drowsiness, nausea, vomiting, constipation, dizziness, headaches, dehydration, hyponatremia, muscle cramps, fatigue, insomnia, dry mouth, blurred vision, irritability, decreased coordination, confusion, high blood pressure, and mood/memory/behavior effects. In addition, these medications put the patient at an increased risk for developing opioid dependency, osteoporosis, infections, and delayed wound healing.<sup>8,9,10,11,12</sup> There were times when the patient presented with some of these side effects, so we altered our treatment or deferred it to a later time to maintain patient safety. There were also a few instances early in her treatment where she presented with symptoms such as



drowsiness, dizziness, blurred vision, confusion, and memory problems, but it was not determined if they were medication side effects or symptoms of her TBI.

#### Diagnosis, Prognosis, and Plan of Care

Initial evaluation data indicated that this patient was significantly impaired due to her orthopedic injuries. Her physical therapy diagnosis included mild TBI, decreased range of motion in multiple joints, reduced strength, low endurance, limited mobility, and she was nonambulatory. Despite her multiple impairments, the patient's prognosis was deemed good because of her young age and healing ability, as well as her strong support system, rehabilitation adherence, and resources to achieve successful outcomes. Two functional short-term goals achieved by the patient included after one week were that patient would be able to transfer from bed to commode with maximal assistance x1 in order to have her catheter removed by nursing to improve her comfort and mobility and after two weeks that she would decrease her maximal pain from 10/10 to 4/10 in order to participate in more functional activities and improve her mobility. Two functional long-term goals achieved by the patient included a decrease in her maximal pain from 10/10 to 2/10 in order to participate in more functional activities and improve her functional mobility and the ability to use a wheelchair independently and safely to maximize her independence and allow her to get around her home, with both goals set for four weeks. Other goals addressed performing transfers safely with her father and increasing her upper extremity motion and strength bilaterally, as well as increasing her motion and strength in the right lower extremity as able per her medical doctor's orders. All of these goals helped guide our plan of care,

which aimed to decrease the patient's pain and improve her safe functional mobility through strengthening and range of motion interventions and to incorporate functional activities to ultimately maximize her independence and prepare her to discharge home. Criteria for discharge from this hospital usually included the 6-Clicks functional measure assessment created from the Activity Measure for Post-Acute Care (AM-PAC) instrument, developed by researchers at Boston University.<sup>13</sup> These short forms are used to categorize patients based on their score into the type of setting to which they would be appropriate to discharge including either home with no services, home with home care, skilled nursing facility, or a long-term care facility. The 6-Clicks was appropriate because it has shown to have strong internal consistency reliability at .957 (95% confidence interval [95% CI]=.956, .958) and .911 (95% CI=.909, .912), respectively. Additionally, the 6-Clicks basic mobility score and Functional Independence Measure (FIM) motor subscore at patients' last visits has shown to be large ( $r=.69$  [95% CI=.62, .75]), as well as the correlation between the 6-Clicks daily activities score and the FIM activities of daily living (ADL) subscore ( $r=.65$  [95% CI=.57, .72]).<sup>14</sup> The score and destination predictor is most important for patient safety, but is secondarily utilized and important for insurance companies. However, as mentioned earlier this patient was not insured so the decision about discharge destination was based on patient safety and support available for her. So, although the patient scored a 13, which would suggest she discharge to a long-term care facility, her minimal pain, home modifications, planned family and caregiver support, and functional mobility accomplishments

supported our interdisciplinary care team's decision to deem her appropriate to discharge home.

### CHAPTER III INTERVENTIONS

The patient was seen 1 to 2 times per day, for 15-minute to 1-hour sessions for 3.5 weeks. It's important to address that we used a patient-centered approach by using collaborative patient/family decision making and a customized comprehensive plan of care to address the patient's needs and achieve her desired outcomes with our physical therapy services, because patient-centered care has been shown to substantially improve the quality of rehabilitation in persons at working age who have sustained fractures.<sup>15</sup> The first week's interventions included bed mobility with maximal physical assistance of two persons and use of comfort glide sheet from supine-to-sit and sit-to-supine, sitting at the edge of the bed for 5 minutes for static balance and midline correction, and stand-pivot transfers on the left leg with physical therapist assistance to/from the commode and wheelchair. Therapeutic exercise included left shoulder and elbow active range of motion (AROM) in all directions, left wrist passive range of motion (PROM), bilateral hand squeezes, right shoulder AROM in all directions, and PROM to the right elbow. The patient and her family were provided education on pressure sores and repositioning in bed every 2 to 4 hours (especially for her right upper extremity), education on wheelchair components, and performing dependent wheelchair propulsion. The second week of treatment

included continued bed mobility, stand-pivot transfers, and AROM and PROM from Week 1. Additionally, dynamic sitting balance with lateral weight shifts were implemented. Further patient and family education was given regarding proper assistance and biomechanics with bed mobility and transfers. The third week of treatment, PT sessions continued to consist of bed mobility, stand-pivot transfers, AROM, PROM, and sit-to-stands from weeks 1 and 2. Additional repetitions of sit-to-stands on the left lower extremity with PT assistance were implemented, as well as left lower extremity exercises including supine left lower extremity heel slides, straight leg raise, ankle pumps, and active hip abduction and adduction. PROM was provided to the right hip for abduction and adduction, knee flexion and extension, and ankle plantarflexion and dorsiflexion. The final week of treatment focused on preparation for discharge. The activities from the first 3 weeks were continued, and the patient was given a home exercise program (HEP) to be performed 2 to 3 times per day, completing two sets of 10 to 20 repetitions of each exercise. The HEP consisted of previous therapeutic exercises with the addition of right lower extremity active assistive range of motion (AAROM) for hip abduction and adduction, ankle dorsiflexion and plantarflexion, pronation and supination, quadricep sets, and gluteal sets, seated right knee extension/flexion AROM, right ankle dorsiflexion, and NWB hand hold assist single-leg partial squats on the left lower extremity. The patient was educated on and practiced safe wheelchair propulsion with her left lower extremity. The patient and her parents were educated on and practiced safe wheelchair mobility up/down a curb and car transfers as well. Our patient greatly

appreciated the day that she was able to propel herself short distances in her wheelchair because it gave her a greater sense of independence. She practiced these wheelchair activities multiple times per day during the last four days of her stay which was significant because literature shows that confidence increases with wheelchair training and experience.<sup>16</sup> Furthermore, a person's level of perceived confidence has been shown to be a key in determining whether or not to perform a behavior, the degree of effort to invest, and the length of time one will persist on a given activity.<sup>16,17</sup> This training was an important aspect in her preparation for discharge home to help facilitate her confidence and independence. Refer to Appendix for detailed interventions and progressions.

## CHAPTER IV

### OUTCOMES

After 1 week the patient reported decreased pain to an average of 8/10 with movement and 4/10 at rest mainly in the right hip, leg, and elbow, along with her left wrist. Her headaches from her concussion were almost completely resolved by this time, but she did still exhibit some drowsiness and inability to focus her attention at times, which could have been attributed to her medications. After 2 weeks the patient was able to perform more out of bed activities with assistance from her parents and decrease her pain to 6/10 with movement and 3/10 at rest. After week 3 the patient was able to tolerate increased range of motion activities and maintain a pain level of 4/10 with movement. Her pain at rest also decreased to a 2/10. At her discharge after 3.5 weeks of physical therapy intervention the patient reported 3/10 pain with movement and 1/10 pain at rest. See below Table 5 for mobility, ROM, and strength at discharge. See Table 6 for discharge general range of motion results.

Table 5. Discharge Mobility Examination at 3.5 Weeks Results:		
Activity	Assistance	Assistive Device
Rolling	Independent	
Sit-Supine	Modified Independent	Head of Bed Elevated
Supine-Sit	Modified Independent	Head of Bed Elevated
Static Sitting Balance	Independent	
Dynamic Sitting Balance	Independent	
Midline Orientation	Independent	
Transfers	Max PA, 1 person assist	Supervision/set up, wheelchair, car
Ambulation	Non-ambulatory due to her injuries	
Wheelchair Mobility	Modified independent to 300'	Right leg rest
Stairs	Dependent, Max PA 2 person assist	

Table 6. Discharge General Range of Motion on Results				
Joint	ROM Within Normal Limits	Min ROM Impairment	Mod ROM Impairment	Max ROM Impairment
L Hip, Knee, Ankle	X			
L Shoulder, Elbow	X			
L Wrist		X		
R Hip, Knee, Ankle			X	
R Shoulder, Wrist	X			
R Elbow		X		

At discharge following physical therapy intervention the patient showed a significant improvement in her bed mobility, transfers, wheelchair mobility,



strength, range of motion, and pain. It was important to initiate early and continued mobilization through physical therapy interventions to decrease her length of stay and maximize her functional mobility for a safe discharge home. She and her family demonstrated understanding of her HEP and her parents' homes were both modified and approved by PT/OT to accommodate for the patient needs. The patient achieved all of her short- and long-term goals in the hospital and was safe to discharge home after 3.5 weeks. Claydon et al<sup>18</sup> state that the most common major trauma injuries are multiple fractures which account for 49% of admissions for major trauma, highlighting the importance of understanding the impact of these complex situations. It's crucial to understand patients' perceptions of repair, rehabilitation, and recovery after major trauma and a physical therapist's role in those perceptions because a qualitative study by Claydon et al has shown that patients view their rehabilitation as their responsibility, but they need expert help to know what to do.<sup>19</sup> It has been demonstrated that PTs are key to getting patients back on their feet by providing them tools to enable them to help themselves, by facilitating physical recovery and improving their function, and by positively impacting their emotional well-being by helping them regain confidence or enjoyment in activities.<sup>19</sup> My clinical instructor and I were integral components of our patient's journey of repair and recovery We helped her achieve positive outcomes and mobility milestones, and though we did not perform any quality of life (QOL) assessments, it was evident that we improved her QOL by helping her improve her functional mobility.

## CHAPTER V

### DISCUSSION

Rationale for treatment was based on literature supporting the importance of early and continued hospital mobilization to decrease length of stay and maximize functional mobility for safe discharge. Treatment was altered or progressed based on her symptoms and/or treatment response. Our mobility interventions and progressions were very similar to those implemented in the 5-point mobility scale described by Azuh et al<sup>2</sup> which may correlate to our patient not developing a pressure ulcer and being discharged sooner than five weeks, which was the initial prognosis estimated by her primary medical doctor. Although the patient's mobility was extremely limited and she was unable to complete levels 4 and 5, she complied with her therapeutic and functional exercises and maintained and gained strength within her weight bearing and range of motion restrictions, which may also support the findings by Gruther et al.<sup>4</sup> Though we did not measure the patients quadriceps femoris thickness, the patient did show improvements in strength from initial evaluation to discharge, showing that she did not become deconditioned during her stay. Recent research has shown that early mobility in the hospital improves functional outcomes at discharge, leads to positive patient outcomes, and shows cost savings.<sup>20,21</sup> Our implementation of physical therapy services as soon as the

patient was cleared off of bed rest by her medical doctor may have been a potential factor in the patient's improved functional outcomes, positive outcomes, and timely recovery. Despite the patient's high risk of developing a pressure ulcer, she never acquired one. Early and frequent range of motion, strengthening and functional activities, all of which were supported by Azuh et al<sup>4</sup> mobility levels and descriptors, are often helpful in reducing risk of ulcer development.

Upon reflection, regarding our plan of care I would have taken goniometric measurements instead of using a general range of motion assessment to provide more accurate, objective, and descriptive values on which to base the patient's progress. I would have also tried to seek further evidence to decipher whether her cognitive symptoms early on such as limited attention, drowsiness, and headache complaints were attributed to her TBI or if they were effects of her medications. If they were symptoms from her medications, we could have consulted with the pharmacists to see if we could have gotten her on a better intake or alter her dosage around physical therapy appointments so that she could have potentially been more participative early in her rehabilitation. I would have also measured her quadriceps bilaterally to see if my findings supported that of Gruther et al<sup>4</sup> which showed a correlation between quadriceps muscle mass and length of stay in the ICU. A limitation to this case is that I was unable to follow-up with the patient post-discharge to track her progress and/or complications over a longer period of time. Lastly, I would have had the patient take a QOL assessment at initial evaluation and discharge to attain a more concrete understanding of her perceptions of her recovery.

## CHAPTER VI

### CONCLUSION

In summary, we utilized physical therapy services for the management and rehabilitation of an 18-year-old female involved in a motorcycle accident which resulted in multiple orthopedic injuries, a mild brain injury, and multiple skin abrasions. The treatment of this patient involved bed mobility, balance activities, transfers, stretching, range of motion, therapeutic exercise, wheelchair mobility, and a variety of patient and family education. Although we cannot conclude the patients accomplishments were influenced by our physical therapy management, at discharge she showed improvements in her 6-Clicks functional measurement assessment score, bed mobility, transfers, wheelchair mobility, strength, range of motion (ROM), and pain.

APPENDIX

## APPENDIX

### Detailed Interventions and Progressions

#### Week One

- Bed mobility: supine-to-sit and sit-to supine
  - 1-2 reps/day
  - Maximal physical assistance (Max PA) x2
  - Comfort glide sheet
- Sitting
  - 1-2 reps/day
  - Minimal physical assistance (Min PA) x1
  - Static, edge of bed (EOB) midline orientation 5 minutes
- Transfers
  - 1-2 reps/day
  - Max PA x2
  - Stand-pivot on L leg to commode, w/c, toilet
- Therapeutic Exercises
  - 2x10/day
  - PROM: L wrist, R elbow
- Patient/Family Education
  - Pressure ulcer prevention and patient repositioning

#### Week Two

- Bed mobility: supine-to-sit and sit-to supine
  - 3-4 reps/day
  - Max PA x1
- Sitting
  - 2x5/twice day
  - Independent dynamic, lateral weight shifts each direction
- Transfers
  - 3-4 reps/day
  - Max PA x1
  - Stand-pivot on L leg to commode, w/c, toilet
- Therapeutic Exercises
  - 2x10/day
  - PROM L wrist, R elbow. AROM: L shoulder, L elbow, R shoulder, bilateral hand squeezes
- Patient/Family Education
  - Bed mobility, transfer assistance and biomechanics

### Week Three

- Bed mobility: supine-to-sit and sit-to-supine
  - 4-5 reps/day
  - Modified independent- head of bed elevated
- Sitting
  - 3-4 reps/day x15-30 minutes
  - Independent static and dynamic sitting edge of bed, w/c, chair
- Transfers
  - 3-4 reps/day
  - Max PA x1
  - Stand-pivot on L leg to commode, w/c, toilet
- Therapeutic Exercises
  - 2x10/day
  - PROM L wrist, R elbow, R LE abduction and adduction, R knee flexion and extension, R ankle dorsiflexion and plantarflexion. AROM: L shoulder, L elbow, R shoulder, bilateral hand squeezes, sit-to-stands on L leg (2x5), supine LE heel slides, SLR, ankle pumps
- Patient/Family Education
  - None added

### Week Four/Discharge

- Bed mobility, sitting and transfers repeated from week three.
- Therapeutic exercises and patient/family education: safe wheelchair mobility up/down a curb, car transfers, and home exercise program:
  - 10-20reps, 1-2x daily
  - PROM: L wrist, R elbow, R LE abduction/adduction. AROM: L shoulder, L elbow, R shoulder, bilateral hand squeezes, sit-to-stands on L leg (2x5), supine LE heel slides, SLR, ankle pumps. AAROM: R LE glute sets. AROM: seated R knee flexion/extension, R ankle dorsiflexion/plantarflexion, L LE hand hold assist partial squats

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