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Physical Therapy Interventions following Acute Traumatic Brain Injury: Early Mobility in the Acute Care Setting

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Signature: Ashley Hicks

Date: July 7, 2017
**TABLE OF CONTENTS**

Abstract .................................................................................................................. 1

Introduction ........................................................................................................ 2-5
  Overview of Traumatic Brain Injury .......................................................... 2-4
  Overview of Early Mobility ...................................................................... 4-5

Case Description .......................................................................................... 6-15
  Examination ............................................................................................... 7-9
  Evaluation .................................................................................................... 9-10
  Interventions ............................................................................................ 11-14
  Outcomes .................................................................................................. 14-15

Discussion ....................................................................................................... 16-21
  Outcomes .................................................................................................. 16-17
  Limitations ................................................................................................. 17-19
  Reflection of Care Practice .................................................................. 19-20

Conclusion ...................................................................................................... 21

References .................................................................................................... 22-24
List of Tables

Table 1 ................................................................................................ 9
Table 2 ................................................................................................ 9
ABSTRACT

Background: Approximately 2.5 million individuals suffered from a TBI in the year of 2010. Many individuals who suffer a TBI are hospitalized for extended periods of time. Studies have shown that extended intensive care can result in deleterious and long-lasting side effects. Early mobility has been utilized to combat effects and has been shown to be safe and effective.

Purpose: To examine early mobility use as applied with respect to this case, a patient with a severe, acute TBI.

Case Description: The patient was a 26 year old male who sustained a TBI following a boat accident. The patient also sustained multiple fractures, abrasions and contusions. Following successful sedation reduction, the patient was re-examined and he was determined to be appropriate for early mobility interventions.

Outcomes: Following treatments, the patient was discharged from the hospital to an inpatient rehabilitation center. Upon discharge, the patient had achieved and exceeded his goals established during re-examination as he was able to complete supine to sit transfers, sit to stand transfers, and ambulate with minimal to moderate assistance.

Discussion and Conclusion: The primary limitation for this study was no defined Early Mobility Protocol within the facility. The patient's results were respectively good and unexpected as he had suffered a severe TBI with multisystem involvement.
INTRODUCTION

Overview of Traumatic Brain Injury

A traumatic brain injury (TBI) is defined by the CDC as any “bump, blow, jolt ... or penetrating head injury that disrupts the normal function of the brain”. Brain injuries vary considerably upon initial examination, and, following further evaluation, the classification of the brain injury is determined: mild, moderate, or severe. The severity of a TBI is determined by a number of factors including duration of loss of consciousness, coma scale rating, post-traumatic amnesia, and brain imaging results. Mild TBIs are associated with short duration post-traumatic amnesia, loss of consciousness and normal brain imaging results, whereas, severe cases present oppositely. The most common TBI is considered mild, or a concussion.

The etiology of TBI pathology is also widely variant and is most correlated to the person’s age. Younger individuals are most likely to sustain a TBI in sporting events and vehicle accidents. The older population is more prone to this type of injury as a result from a fall. Gender is another correlating factor with regard to etiology. Across the lifespan, males are significantly more likely to sustain a brain injury than their female counterparts. The largest disparity between genders is during adolescence and young adulthood. Both the number of individuals who sustain a TBI in the nation each year and require subsequent hospitalization have been steadily increasing over the last decade. Approximately 2.5 million individuals suffered from a TBI in the year of 2010. For those who acquire a more severe brain injury, hospitalization is required. More than ten percent of those who sustain a head injury classified as a TBI are hospitalized.
A TBI can have a significant impact on a person and their normal, functional ability. Prognoses for individuals who suffer from a TBI vary substantially, and TBI prognosis is difficult to accurately calculate or establish.\(^6\) An individual’s prognosis is closely correlated to the severity of the TBI determined upon evaluation; that is, a severe TBI is associated with poorer prognosis (directly proportional).\(^7\) For more mild cases, the effects of a brain injury may be as simple as being temporarily removed from sport play or an irritating headache that lasts a few days. For more severe cases (those that require hospitalization), the effects can be more significant and longer-lasting. According to the CDC, nearly half of those hospitalized after a severe TBI will have a “related disability” lasting through a year. Disabling effects resulting from a severe TBI can disrupt an individual’s cognitive function, motor function, sensation, and/or typical emotions and behaviors. There are more than five million Americans currently affected by the results of a severe TBI.\(^8\)

Current physical therapy (PT) interventions in the acute setting vary significantly in different settings.\(^9\) Similarly, acute PT interventions for those who have suffered from a TBI are not well defined as each case varies greatly. A single protocol/program for PT is not possible as each case requires a unique approach to address individual limitations and deficits. However, studies have shown PT treatments with patients in the neurological intensive care unit to be safe.\(^10\) In general, physical therapists in the acute setting are often thought of as the ambulation and transfer team/specialist.

Acute PT care and corresponding goals are produced as part of a continuum of care, so goals are established based on the patient’s discharge plan. Plans for future need of care are created, and the current plan of care is developed in preparation. Future
preparation considerations are important when developing a PT plan of care, outcome measures, and goals. Those with plans to discharge home with continued outpatient/home health care (if needed) must accomplish the required ambulatory/stair negotiation skills in order to safely return to home living. For those with developed plans to discharge from the hospital to inpatient rehabilitation, transitional care units, or a nursing home, different ambulatory/transfer requirements may be necessary to accomplish before release.

Overview of Early Mobility

Many studies have been done to identify a number of effects following long-term care in the acute care setting. Previous thoughts regarding the care of those in critical and intensive settings were that these individuals were unstable and should be handled delicately with ample amounts of bed rest as they were “too sick” to exercise.\textsuperscript{11} Unfortunately, passive, delicate care has been shown to be correlated with many effects that are deleterious and long-lasting. Many studies have identified different physical, cognitive and mental health impairments that are often acquired with intensive care. Impairments resulting from acute/intensive care include hospital acquired generalized muscle weakness, respiratory muscle weakness, systemic inflammatory syndrome, anxiety, posttraumatic stress disorder, ICU delirium, and depression.\textsuperscript{12} The expression “post-intensive care syndrome” has currently been conceived as an all-inclusive term for the many different negative effects associated with intensive care. Post-intensive care effects have been shown to often persist for many years after initial onset/discharge from intensive care and hospitalization.\textsuperscript{13} Since recognizing the complications accompanying
intensive/critical care, much has been done to develop a care plan that will counter them. One promising plan has been found in the form of early mobility.

Early mobility can be defined as “beginning the mobility program when the patient is minimally able to participate with therapy, has a stable hemodynamic status, and is receiving acceptable levels of oxygen.” Early mobility has been found to have many different benefits as compared to usual care. Many studies have been done to discover the feasibility, safety, and effectiveness of an Early Mobility Program to reduce the effects of intensive/critical care and hospitalizations, regardless of the involved patient’s diagnosis, as recorded above. Early mobility goals include, but are not limited to, improving muscle strength, functional mobility and overall quality of life, as well as reducing the length of stay, duration of ventilation, and overall cost of care.

Research on early mobility is beginning to progress towards evaluating the use of early mobility related to a specific diagnosis such as respiratory failure. Much investigation was done during the development of this case, and as far as can be told, there is no current research specifically addressing the possibility of neurorehabilitation incorporated into early mobility or the use of early mobility to reduce long-lasting effects resulting from a severe TBI. However, one study has concluded that patients are more likely to transfer, stand, and walk (standard early mobility activities) when discharged from neurologic intensive care. The purpose of this case is to discuss early mobility use as applied with respect to this case, a patient with a severe, acute TBI. It is important to note that the particular facility related to the patient’s care does not have an established Early Mobility Protocol; thus, early mobility as a whole will be reflected in this case rather than a specific protocol.
CASE DESCRIPTION

This case involves a 26-year-old Caucasian male. The patient was involved in a boating accident early in the morning. The patient was found unconscious at the scene and taken to the local hospital. Upon examination, the patient was determined to have a Glasgow Coma score of 7 out of 15 (8 or less indicating comatose client and 3 indicating unresponsive). At that time, the patient was intubated, sedated and then transferred to the larger, area hospital. Examination at the larger facility determined the patient to have a Glasgow Coma score of 3 (lowest score attainable). The patient immediately went in for a neurology consult and a head computed tomography (CT) scan was performed. The patient was found to present with a subarachnoid hemorrhage (SAH) and subdural hematoma (SDH). Other imaging showed the patient to have sustained a frontal lobe fracture, a left pneumothorax, rib fractures of 1, 2 and 10 on the left and first rib fracture on the right, a sternal fracture, right and left mandibular fractures, cerebral contusion, clavicular fracture on the left, a left distal tibia fracture, and several lacerations and contusions. Though not found at initial examination, the patient also sustained left wrist fracture. The left wrist fracture was found near the patient's time of discharge from the hospital.

The involved patient presented with a medical history of West Nile Virus (2003), a right distal fibular fracture (2005), depression with suicidal ideation (2011), and a wound infection to the right hand (2012). He has no pertinent past surgical history. His family history includes type II diabetes in father and paternal grandmother and grandfather. Prior to his accident, the patient worked as a truck driver and for a farmer.
His family reported that he was fully independent. The patient does not smoke and drinks one to two times per week at which time he consumes four to five drinks. Discharge status/location was not formally assessed with initial development of plan of care. It was later determined that the patient would likely return to live with his parents for further attention and supervision upon discharge from formal health care.

Throughout and following the initial examination, the patient remained intubated and was sedated. Following consult with the neurosurgery, a plan of care was established. The patient was placed on central and arterial lines and a left chest tube was placed. He was placed on bedrest until otherwise cleared. A Foley was put in place to accurately measure intake and output (I&O). Propofol was continued for sedation and Clindamycin was started for the neck and facial wounds. The SAH and SDH would be continued to be monitored with follow up as needed.

Examination

A physical therapy (PT) examination was performed nine days following injury onset (see Table 1). PT was ordered when the patient was deemed safe to participate as his SAH, SDH, oxygen saturation (SaO₂), heart rate (HR) and blood pressure (BP) remained regularly stable. At the time of initial examination, the patient was still intubated and sedated. The patient was unable to provide history at this time, but his family was present and they were able to provide essential information as described above in the case description.

Throughout the examination, it was noted that the patient grimaced with passive range of motion (PROM) to the left shoulder. Clavicular fracture precautions were
followed with left shoulder and PROM was limited to 90 degrees of elevation throughout examination and subsequent interventions. All other extremities presented with full PROM with exception of left ankle which remained immobilized in an air cast secondary to ankle fracture throughout examination and future therapy visits. Also upon examination, it was noted that the patient independently flexed his hips and knees, but not to command. A five to seven beat clonus was noted at the right ankle with a quick dorsiflexion stretch. Vitals remained stable throughout examination. No other formal assessments/measures were completed at this time.

Re-examination was performed seven days following initial examination due to significant changes in patient status. Upon re-examination, the patient remained intubated. The patient could follow some commands and was able to answer close-ended questions (i.e. if he wanted his glasses and if he wanted to sit). As the patient was still non-vocal at this time, additional history and patient goals could not be acquired or established. He was able to indicate generalized pain during/following re-examination, but he was unable to provide more specific information. Though not objectively evaluated, following later discussion, it was determined that the patient presented at a Level 5 (Confused-Inappropriate) on the Rancho Los Amigos Cognitive Functioning Scale (see Table 2 for related psychometrics). No other formal assessments or test/measures were performed as the patient could not follow many of the higher level commands required to complete the assessments. Strength and active range of motion were assessed as a product of functional abilities and assistance required to complete functional tasks including bed mobility, transfers and ambulation.
**Table 1**

<table>
<thead>
<tr>
<th>Post-injury Day</th>
<th>Description of Event</th>
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<tbody>
<tr>
<td>0</td>
<td>Sustained TBI</td>
</tr>
<tr>
<td>0-9</td>
<td>Admitted to the hospital and closely monitored, PT initial examination completed on day 9</td>
</tr>
<tr>
<td>10-16</td>
<td>PT and OT included PROM to upper and lower extremities</td>
</tr>
<tr>
<td>17-22</td>
<td>Re-examination completed; PT and OT included transfers and ambulation; during this time, patient was transferred to hospital floor</td>
</tr>
<tr>
<td>23</td>
<td>Patient discharged from hospital to inpatient rehabilitation facility</td>
</tr>
</tbody>
</table>

Table 2: timeline of events occurring in patient care relative to onset of injury

**Table 2**

<table>
<thead>
<tr>
<th>Assessment Tool</th>
<th>Reliability</th>
<th>Validity</th>
<th>Inter-rater reliability</th>
<th>Sensitivity</th>
<th>Minimal Change for Clinical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glasgow Coma Scale</td>
<td>-</td>
<td>Adequate in relation to Glasgow Outcome Scale</td>
<td>Adequate</td>
<td>-</td>
<td>2 (Most conservative)</td>
</tr>
<tr>
<td>Ranchos Los Amigos Cognitive Functioning Scale</td>
<td>High&lt;sup&gt;22&lt;/sup&gt;</td>
<td>Moderate to High&lt;sup&gt;22, 23&lt;/sup&gt;</td>
<td>High&lt;sup&gt;22, 24&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Physical Function</td>
<td>-</td>
<td>Moderate&lt;sup&gt;15&lt;/sup&gt;</td>
<td>High&lt;sup&gt;25, 26&lt;/sup&gt;</td>
<td>-</td>
<td>1.5 on a 10 scale basis&lt;sup&gt;26&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Table 1: Psychometric measure related to tests used during the duration of patient's care

**Evaluation**

Following initial examination, goals and a plan of care were developed for the patient. At this time, it was difficult to fully determine a rehabilitation prognosis and expected outcomes as little was known with regard to the patient's cognitive, motivational, and behavioral status; however, it is important to note that independent
movement of extremities and no presentation of decerebrate posturing did reflect positively for recovery potential. Standardized goals previously set by the facility were deemed appropriate to apply to the patient following examination. The primary goal was to maintain range of motion (ROM). No PT goals were made with regard to positioning to prevent bed sores and pressure ulcers as this intervention did not fall under the responsibilities of care for the PT department within the facility. Future goals were established at this time to be used once patient status changed. Once the patient was extubated, the applicable goals would include performing a supine to/from sitting with moderate assistance (MOA) of two, sitting on the edge of the bed (EOB) for 10 minutes with minimal assistance (MIA) of two, and tolerate being out of bed (OOB) for two hours/session. Re-examination would be performed if significant changes in patient status warranted the process.

Following re-examination, 17 days injury onset, new goals and a new plan of care were established. Anticipated prognosis and expected outcomes were better judged at this time. The patient was able to follow low-level commands and closed-ended questions, suggesting a greater prospective for successful return to function. The patient remained intubated at the time of re-examination, so new goals were established to address the potential for mobility despite no extubation. These goals included being able to perform supine to/from sitting with MIA of two, sit on EOB for 10 minutes with MIA of two, stand pivot transfers with MOA of two, and to tolerate sitting up in a recliner chair for one hour/session two times a day. Based on the patient's abilities, cognitive function and hemodynamic stability at the time of re-examination, these goals as well as the interventions necessary to complete these goals were determined to be appropriate.
Interventions

Therapies began following initial evaluation with PROM and stretching to bilateral lower and upper extremities completed by PT and Occupational Therapy (OT) respectively. Stretching and ROM activities were completed in the supine position within the precautionary parameters for the aforementioned fractured limbs. As it was not known that the time of evaluation, the left wrist was passively mobilized, but due to the discomfort noted by facial grimacing, left wrist ROM was discontinued at each visit. Primary attention for stretching was focused on plantar, wrist, and finger flexors as a preventative measure for typical, neurological spasticity patterns. During this time, the patient remained sedated and the patient was removed from endotracheal intubation and placed on a tracheostomy tube intubation. The patient was also placed on percutaneous endoscopic gastrostomy (PEG) tube for feeding.

Also at this time, multiple attempts were made by the physician to reduce the patient’s sedation levels. These early efforts for sedation reduction resulted in the patient becoming agitated and restless, so sedation would be returned to previous levels accordingly. It is usual for appropriate therapies (i.e. PT, OT and/or respiratory therapy) to be present during these sedation reduction attempts with standard Early Mobility Programs. However, as the involved facility for this case did not have an established Early Mobility Program, therapies were not regularly present during sedation reduction attempts.

The initial intervention ROM strategies were employed for one week until the patient was able to tolerate reduced sedation levels. When the patient was able to tolerate reduced sedation without agitation, a new PT evaluation was completed. Mobility was
able to begin at this time. Mobility began with supine to sit transfer with assist of four (one to hold neck/head, one to manage left upper extremity, and two to move patient with a sheet) and sitting on EOB for five to seven minutes with MIA-MOA of two. Patient was then returned to supine position. At this time, the patient could follow simple commands and answer some questions (via nodding/shaking head) appropriately. Non-weight bearing (NWB) precautions were maintained for the fractured clavical of the left upper extremity. The left upper extremity NWB precaution protected the fractured left wrist well throughout the patient’s episode of care. An orthopedic consult was requested immediately following re-evaluation to establish weight bearing precautions for the fractured ankle on the left lower extremity. This visit and all other successive visits were performed as co-treatments with PT and OT present.

The patient was able to quickly wean off the ventilator, and the following day, the patient completed a supine to sit transfer with maximal assist (MAA) of two and was able to sit on the EOB with MIA of one. Despite no clarification for left lower extremity weight bearing from the orthopedist, the primary PT determined that it was safe for the patient to attempt standing. This determination was made as the patient was able to follow simple commands, denied any pain in left lower extremity, and the walking controlled ankle movement (CAM) boot would be used. The patient was able to stand for approximately one minute, two times before completing pivot transfer to chair with MOA of one. The patient denied pain in left lower extremity throughout the transfer. The patient then accomplished five repetitions of simple bilateral, seated lower extremity exercises with assistance (knee extension and hip flexion).
The following day, the orthopedic consult was completed. No specific weight bearing orders were given, but the orthopedic physician wrote that he would prefer to have patient be NWB on his left lower extremity. Despite several attempts, the patient was unable to follow the provided commands in order to perform transfers and ambulation accordingly. An assistive device to help the patient maintain NWB was deemed inappropriate due to his NWB status on the left upper extremity and his inability to learn new information due to his cognitive level. Though the patient self-selected weight bearing on left lower extremity, he continued to deny pain in the lower extremity. As no pain was experienced and he was not able to follow NWB commands, transfers and, eventually, ambulation were cautiously continued. Five days later, the orthopedic physician ordered weight bearing as tolerated (WBAT) as follow-up x-ray of the left ankle showed no movement or change of the fracture despite weight bearing.

The patient's plan of care and mobility continued. Bed mobility and transfers continued with the walking CAM boot in place and PT/OT present. Throughout these treatments, the patient was given more independence as he was able. Ambulation was initiated three days after re-evaluation, 20 days after onset of injury. The patient was able to ambulate 45 feet with MOA of one while holding on the railing with right upper extremity. During ambulation and transfers, OT supported the left upper extremity as the patient strongly declined to wear the prescribed sling. The patient was mildly impulsive and had reduced cardiovascular endurance. The patient was followed with a wheelchair during ambulation, and he rested as needed. Therapies continued and progressed as the patient was able to tolerate and as appropriate until discharge to a local, inpatient rehabilitation center 13 days after initial therapy examination.
It is important to discuss that the patient’s vital status was monitored closely throughout all interactions of care. The patient’s heart rate, blood oxygen saturation, blood pressure and electrocardiography were monitored continuously. Throughout PT visits, the therapists were able to actively observe the patient’s physiological response to care by viewing a monitor located in his room that relayed the patient’s vitals status. Later in his care, when the patient was able to ambulate beyond the confines of his room, continued monitoring of the patient’s vitals was performed using a mobile electrocardiograph unit and pulse oximeter. Telemetry staff was on call throughout his care to report any significant changes in the patient’s status.

Outcomes

At the final acute PT session, the patient was able to complete supine to sit transfers with MIA-MOA of one, sit to stand transfers with MIA-MOA of one, and ambulation with CAM walking boot with MIA of two (one for assist of left upper extremity as patient continued to decline sling). The patient was able to ambulate 150 feet without use of handrail. At this time, the patient’s cognition had improved as well since the initial examination, and he was consistently oriented to person and inconsistently oriented to place. He continued to answer closed-ended questions appropriately and was able to vocalize requests. At discharge, Glasgow Coma Scale rating was not formally assessed, but a clinically judged score would be a 15.

At final assessment, goals set at the re-evaluation were reviewed to determine if they had been met. Based on patient’s abilities at discharge, though his abilities were not precisely identical with the pre-established goals, it was decided that the patient had met
and exceeded his patient goals. The patient’s goals focused on transfers and upright tolerance. At discharge, the patient was able to complete transfers at a comparable level to the goals, was able to tolerate upright sitting as defined by the goals, and was able to complete ambulation despite no correlating goal.

Patient was discharged from acute physical therapy and from the hospital 23 days post-accident. Upon discharge from acute physical therapy and the hospital, patient was transferred to the local inpatient rehabilitation center.
DISCUSSION

Outcomes

No additional information from the inpatient rehabilitation center was formally gathered to supplement this case study. However, it is standard treatment protocol in the rehabilitation facility for patients to complete three hours of therapies, an accumulation of both physical and occupational therapy, daily. Upon discharge from the rehabilitation center (exact length of stay unknown, but approximately three weeks) the patient returned to the hospital for follow up and a friendly visit. While I did not get the opportunity to interact with him, a colleague did get to meet with this patient. My colleague indicated that the patient’s was able to complete all transfers independently and ambulate with CAM walking boot without assistance or use of a device. He was fully orientated to time, person, place and situation. At that time, he and his caregivers informed therapy that he was going to continue therapy in an outpatient setting within their hometown.

It would be remissive not to discuss the patient’s positive, personal factors likely associated with the patient’s outcome. The patient appeared very motivated to work with therapies throughout his episode of care as he never decline rehabilitation interventions. More accurately, the patient quickly agreed to participate in therapies at each session. During therapy sessions, the patient rarely requested breaks during activity. Rather, the patient needed to be encouraged to rest during interventions when his physiological response to increased activity warranted the action. It cannot be determined if the need to promote breaks was due to the possibility of a highly motivated attitude held by the
patient or if it was a product of decreased judgement capacities or impulsive conducts resulting from the TBI. Not only was the patient agreeable to perform the interventions proposed by therapies, but his family members also approved of rehabilitation. The patient’s family members were ever present throughout his acute care stay and were supportive and encouraging.

It is difficult to compare the patient’s results to others’ as TBIs present with an immense number of variables and factors related to outcomes. Any correlated relations in outcomes cannot be deemed a causation of care as any patient who sustains a TBI presents with a different level of neurological insult severity, body system involvement, and recovery potential. With regard to this case, it cannot be categorically determined that the patient’s outcomes were a result of early mobility alone. However, early mobility care can be deemed a contributor in the patient’s results and was likely beneficial overall.

In general, it has been shown that those who sustain a mild brain injury have a better prognosis and greater recovery potential resulting in better outcomes, relative to those who sustain a severe brain injury. This case involved an individual who sustained a severe TBI who’s outcomes were atypical relative to general prognostic concepts. Overall, the patient experienced favorable, unexpected outcomes relative to the severity of his injuries.

Limitations

There are several limitations of this case study. One of the primary limitations of this study is that the involved facility did not have an established Early Mobility Program/Protocol. Lack of a defined Early Mobility Program resulted in some patient
care incongruity between disciplines as therapies were not regularly present during sedation reduction attempts. Lack of a distinct protocol also resulted in absence of early mobility equipment which would have allow the patient to ambulate while still intubated and requiring mechanical, ventilation support. However, the patient quickly was able to quickly wean off mechanical ventilation and was able to progress to early ambulation despite lack of equipment.

Another limitation of this study was a result of lack of important information relative to the patient’s care. It was important to know as much information as possible before beginning early mobility with the patient. Knowing the patient’s left lower extremity weight bearing status as well as knowing about the patient’s left wrist fracture prior to therapy care was important to provide the patient optimal care. This will be further discussed in the reflection of care below.

A final limitation to this case was the lack of additional/supplemental information regarding the patient’s care. Additional information could have included further neurological notes as well as therapy notes from the inpatient rehabilitation center. The information could have provided further explanations for the patient’s unexpected outcomes. This could have been beneficial as the information in the case could then be more readily used as a reference when caring for other individuals who sustain a TBI. As described earlier in the discussion, it is difficult to use the information in this case comparatively as there are too many outcome variables associated with sustention of a TBI.

The limitations discussed above should be addressed in future studies. Studies should also be done to determine the most effective Early Mobility Program; that is,
studies could determine if one program is superior to another or if early mobility is, in general, beneficial. Most importantly, future studies should address early mobility and its effects on specific diagnoses. As early mobility has been seen to be commonly advantageous, future studies should identify the efficacy of utilizing early mobility for a variety of diagnoses and determine if any specific alterations should be made to achieve successful outcomes for an assortment of patients.

*Reflection of Care Practice*

Upon review of the patient’s treatment and care, a few care alterations were identified that could have been made to provide more complete and optimal care for this patient. The recognized care alterations may have also provided further objective measures to assess and determined possible factors aiding in the patient’s unexpected outcomes. Obtaining a further history, though likely beneficial, was not possible due to the patient’s cognition level throughout his care.

Examination of the patient was quite thorough by each discipline involved throughout the patient’s episode of care; however, the left wrist fracture should have been identified earlier in the patient’s episode of care. During therapies, it was noted that the patient would not use his left arm and hand. Initially, therapies concluded that this could be due to a possible neurological injury. Later, this possibility was deemed unlikely as there were no other indications of neurological insult affecting the left upper extremity. The patient’s avoidance to use his left upper extremity was then decided to be a result of his clavicular fracture. The patient did acknowledge pain of this left arm in general, but a specific location of the pain was unobtainable. Fortunately, the patient’s plan of care and
NWB restrictions for the left upper extremity due to the left clavicular fracture protected the left wrist.

An additional assessment tool that could have been valuable to the patient's care is the Physical Function ICU test (PFIT). After reflection, it was determined that this test would have been appropriate for the patient involved in the case. This assessment tool has been shown to be safe and effective within the intensive care setting.\textsuperscript{25} The original assessment was created for the purpose of measuring patients who were not capable of completing more rigorous assessment (i.e. the 6 minute walk test).\textsuperscript{27} An adapted version, the PFIT-s, has since been developed and includes a sit-to-stand transfer, cadence with marching in place, shoulder strength and knee strength. The test is scored on a 0-3 scale and is a derivative of assistance required to complete the task and a defined scale resulting from standard manual muscle tests. A higher score indicates improved likelihood to return home upon discharge and improved quality of life.\textsuperscript{25} The PFIT-s tool could have provided more objective information that could have been applied to the case and furthered the discussion of the patient's outcomes.

Finally, an additional care practice that would have been ideal to complete for this patient was referral to an appropriate provider to address possible psychiatric distresses the patient could encounter following the patient's traumatic accident. As the patient had experienced a depressive episode with suicidal ideation previously and the accident resulted in physical and possibly emotional traumas, early intervention could be helpful to circumvent a possible depressive relapse. As I was not privy to additional care following discharge from hospital services, this action could have been taken without my knowledge.
CONCLUSIONS

Overall, the patient’s outcomes upon discharge from the acute care facility were largely favorable relative to his prior level of function, multisystem involvement, sustention of a severe TBI, and his abilities upon examination. Early mobility can be considered a factor that potentially led to the patient’s results; however, due to the significant number of potential factors related to production of the patient’s outcomes, early mobility cannot definitely be determined to be the primary contributor the patient’s good outcomes. Despite the described complication, it can be deduced that early mobility was likely a beneficial component in this patient’s episode of care.
REFERENCES


