CASE REPORT

Clinical Decision-Making for Discharge Recommendations for a 63-Year Old Male with Foot Drop Status Post Great Toe Amputation: A Case Report

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ABSTRACT

Background and Purpose: Making a discharge recommendation from an acute care setting involves many factors and a coordinated team effort, and discharging a patient to an inappropriate setting can have adverse effects. Physical therapists have shown to be able to make appropriate and accurate discharge recommendations. The purpose of this case report is to apply a model of discharge decision-making and analyze the results in the case of an older adult male with foot drop status post great toe amputation. This model is not only meant to improve decision-making efficiency for physical therapists and other health care professionals, but it also focuses on the patient's desires and aids in allowing everyone involved to reach a consensus. ***Case Description***: SF was a 63-year old male with a history of Type II diabetes mellitus, alcohol abuse, and cerebrovascular attack. He was seen in acute care status post left great toe amputation. ***Approach:*** Clinical decision-making in discharge planning was based on four constructs within the model: his function and disability, wants and needs, ability to participate, and life context. Information was analyzed in light of therapist experience, health care regulations, and opinions of medical team members. SF was recommended to be discharged to a subacute rehabilitation facility. ***Discussion:*** Although the patient's personal wants were not consistent with the other three constructs, the physical therapists were able to exercise skilled clinical reasoning to recommend the appropriate discharge setting through the use of the implemented model of discharge decision making. Further studies are needed to establish the model's validity and reliability.

Background and Purpose

Physical therapists (PTs) and other rehabilitation professionals in acute care settings are often confronted with difficult situations requiring sophisticated clinical reasoning and decision-making skills.[1-7] Many of these situations involve the appropriate discharge planning and placement recommendations for patients when they leave the acute care setting.[1-3,8] Shepperd *et al*. describes the process of discharge planning as preparations made before a patient leaves the hospital for follow-up services that will enhance patient outcomes while also being cost-efficient.[8] Clinical decision-making for discharge planning from the acute care setting often involves a number of factors and a team of health care professionals.[1,2,9] Some of these factors include the patient's current and prior levels of function, age, socioeconomic status, comorbidities, cognitive status, living situation, and family support. It is important to consider these factors to determine the appropriate discharge destination for a patient in order to allow them to maximize their functional mobility and achieve their overall goals.[1,2,4]

If a patient is discharged before they are ready or without suitable planning, they are more likely to encounter problems, including unplanned readmission to the

hospital.[2,8,10,11] In a Dutch study by Mistiaen *et al*, 145 elderly patients (mean age = 75.6 years old) were asked about problems experienced at home one week after being discharged from an acute care setting. 79% of participants in the study reported being insufficiently informed mainly regarding illness recovery time and signs, insurance, and how much they need to rest. Regarding functional limitations, 77% reported housekeeping as being their primary difficulty with 74% reporting mobility as a secondary difficulty, which is noteworthy as the participants reported having no problems with these activities prior to hospitalization. Additionally, many stated having a physical complaint such as being easily tired (75%), having unstable posture (69%), having pain (54%), and not sleeping well (42%).[11] Additionally, a literature review found that patients who received a thorough discharge plan experienced a reduction in hospital length of stay, a significant decrease in unplanned hospital readmission, a reduction in days in the hospital if they were readmitted, and lower total hospital charges.[8]

Using high-level clinical reasoning, PTs have shown to be able to provide a valuable contribution in making appropriate recommendations for discharge planning.[2,4] PTs perform continuous dynamic assessments of patients during each visit and constantly obtain information that guides their decision-making for interventions and discharge planning.[4,6] Nurses have reported their perception is that they receive more information about patients from PTs than from their nursing colleagues.[9] Some PTs have also stated that their input is widely respected among most of the medical team at their facility and that their decision about if a patient can go home or if they need to go to rehabilitation is dependent upon PTs input.[4] Furthermore, Smith *et al*. at the University of Michigan Hospital discovered that physical therapists' discharge recommendations (discharge setting and follow-up services) were implemented 83% of the time at their facility. Patients who did not receive discharge recommendations provided by a PT were 2.9 times more likely to be readmitted to the hospital within 30 days of discharge. There was also an increased likelihood of positive outcomes for the patient, and for the hospital, through a decreased risk of readmission when PT discharge recommendations were applied.[2]

There are many models that direct the decision-making processes of health care professionals.[1,12-14] For this case report, the model utilized to guide clinical reasoning and decision-making was the theoretical model of discharge decision making (MDDM) proposed by Jette *et al* (Appendix A).[1] According to this model, a PT performs an initial evaluation to examine the patient and collect information focusing on their functioning and disability, wants and needs, ability to participate in care, and the context of the patient's life. An initial impression of the physical therapist's discharge recommendation is then produced after the PT considers and applies their clinical experience to the examination information. The PT then takes the regulations of the health care system into account to see which options are feasible for the patient. Following this, the PT will share his or her opinions with the rest of the medical team before developing their final recommendation for discharge destination.[1]

The clinical decision-making process for discharge placement among PTs in the acute care setting is not well-documented in the literature.[1,15] The purpose of this case report is to report the implementation of Jette's model of discharge decision making in order to determine the appropriate discharge placement from the acute care setting for an older adult male with foot drop status post great toe amputation. Additionally, this case report will illustrate how this model

encourages the comprehensive involvement and collaboration between PTs, the patient, his family, and the rest of the health care team in order to effectively work together.

Case Description

History

SF was a 63-year old retired Caucasian male with a history of Type II diabetes mellitus and alcohol abuse who was admitted to an acute care unit of a large teaching hospital. He sustained an open wound on his left great toe after forcefully stubbing and injuring it while intoxicated. This wound became infected with osteomyelitis after hospital admission and required emergency amputation; he was referred to physical therapy (PT) two days after surgery. Several years prior to this incident, SF experienced a cerebrovascular accident (CVA) in his right hemisphere; the only residual deficit that resulted was neuromuscular left foot drop. He participated in PT in the acute rehabilitation unit in the hospital after his CVA and was issued an ankle-foot orthosis (AFO) to wear during ambulation. SF reported that he was not wearing the AFO at the time of the injury. The patient's prior level of function was completely independent with ambulation and all of his activities of daily living (ADLs). He stated that he was able to ascend and descend one step to enter and exit his home, but that he typically only ambulated around the house and when he was getting the mail. At the time of this case report, he was unmarried and lived in a one-story home with his sister who reported only being able to provide intermittent assistance for SF. She also reported that he rarely adhered to regularly wearing his AFO. He was referred to PT to evaluate his functional mobility post-amputation and to aid in determining the appropriate discharge location. The surgeon restricted SF to a non-weight bearing (NWB) status on his left forefoot but was permitted to bear weight on his left heel during transfers. He was also instructed to keep his left lower extremity elevated while seated or positioned supine. The patient verbalized that he was aware of the need for PT in order to reach his goal of returning home and returning to his prior level of function.

Systems Review

SF's integumentary system was impaired due to the left great toe amputation, however the wound itself showed no signs of infection; sutures were still in place and the wound dressing was clean, dry, and intact. His neuromuscular system was significant for diabetic neuropathy in his left foot and left foot drop. SF showed no impairments in his musculoskeletal and cardiopulmonary systems. Cognition was unimpaired as the patient was alert and oriented to person, place, and time. SF reported feeling a slight and aching pain at the amputation site at the time of initial evaluation.

Clinical Impression

Based on his prescribed weight-bearing status and the findings from the systems review, tests and measures were selected in order to assess the patient's functional mobility and ability to perform bed mobility, transfers, and ambulation with an assistive device to initiate progression towards the patient's goals.

Tests and Measures

Active Range of Motion. Active range of motion (AROM) was selected in order to assess SF's current range for functional mobility (Table 1). The patient was received sitting in his bedside chair at initial evaluation and reported being very tired after many visits from other health care professionals earlier that day and insisted on staying in his chair. Thus, range of motion

was taken with the patient seated. A universal goniometer was used to take the measurements using the palpation landmarks specified by Reese and Bandy (2010).[16] This student physical therapist (SPT) recognizes that the method used to obtain SF's hip flexion, knee extension, and knee flexion did not follow standard procedure for obtaining AROM as outlined by Reese and Bandy; however the patient persisted in remaining seated for the duration of the examination due to reported fatigue. Passive range of motion for left ankle dorsiflexion was also measured, and spasticity was not observed during ankle plantarflexion.

Goniometry for range of motion has generally been found to be reliable. Clapper and Wolf found good to excellent reliability using a standard goniometer to measure knee and ankle range of motion; Intraclass Correlation Coefficients (ICC's) were 0.95 for knee flexion, 0.85 for knee extension, 0.92 for ankle dorsiflexion, and 0.96 for ankle plantarflexion.[17]

Regarding hip range of motion, Nussbaumer *et al*. found test-retest reliability to be good for flexion (ICC=0.916), abduction (ICC=0.924), external rotation (ICC=0.914), and internal rotation (ICC=0.95); however the ICC for adduction was 0.842. Concurrent validity was found to be good between a conventional manual goniometer and an electromagnetic tracking system (ETS) for abduction (ICC=0.937) and internal rotation (ICC=0.875) but poor concurrent validity for flexion, adduction, and external rotation (ICC's <0.55 for all three motions). The authors also report a possible systematic bias due to all ROM measurements being significantly greater for the goniometer compared to ETS.[18]

Manual Muscle Testing. Manual muscle testing (MMT) was selected to evaluate and assess individual muscle strength in the patient's upper and lower extremities (Table 2). These measures were obtained in order to evaluate the patient's ability to perform bed mobility (supine to and from sitting), transfers (sitting to and from standing, bed to and from chair), and being able to ambulate with an assistive device while maintaining his weight-bearing status. All of these activities require functional and sufficient upper and lower extremity strength. SF's left dorsiflexion strength was graded 2+ as the patient was unable to actively dorsiflex through the full range of motion due to foot drop sustained from his previous CVA. All strength measures were performed following the procedure outlined by Hislop and Montgomery (2002)[19] except for hip extension, which could not be formally measured in prone due to the patient's preference to remain seated. However, SF performed one sitting-to-and-from-standing transfer with minimal assistance using a gait belt and a rolling walker (RW); from this it can be inferred that he had hip extension strength of at least a muscle grade of 3 in order to perform this transfer, according to Nordon-Craft *et al*.[7] When performing all other MMT, the therapist attempted to hold the position for five seconds with resistance gradually building up while asking the patient to also apply resistance to hold the position. For a Grade 5 MMT, a patient should be able to handle the resistance for the full five seconds.[19]

Inter-rater reliability of MMT was shown to be excellent in a study by Fan *et al*. which looked at 19 pairs of trained examiners performing MMT on 26 muscle groups. The overall composite MMT score ICC (95% CI) was 0.99, and the kappa value was 0.88 for detecting clinically significant weakness.[20] Bohannon demonstrated good convergent construct validity between MMT and a hand-held dynamometer (R=0.887) though reports limited discriminant validity.[21]

Levels of assistance were also utilized to determine the patient's baseline and also to measure progress. For this case report, the therapists followed the definitions for assistance levels provided by Pierson and Fairchild (2013):[22]

- Modified independent (Mod IND): The patient uses adaptive or assistive equipment to perform a task independently.
- Minimal assistance (Min A): The patient performs 75% or more of the activity.
- Moderate assistance (Mod A): The patient performs 50% to 74% of the activity.
- Maximal assistance (Max A): The patient performs 25% to 49% of the activity.

Approach

Jette *et al*'s model is based on four constructs: functioning and disability, wants and needs, ability to participate, and context of life. Each of these constructs are addressed in separate sections and then analyzed by looking at the therapist's experience, shared opinions from other health care team members, and health care regulations before arriving at a final recommended discharge destination.

Functioning and Disability

"Functioning and disability," as defined by Jette *et al*., mainly includes "impairments or meaningful deviations or loss in bodily functions or structure."[1] SF participated in PT for a total of three visits with one visit per day and was seen on non-consecutive days. He was initially observed sitting in his bedside chair with his left leg elevated on the hospital bed, which was in its lowest position. He reported that he was very tired that day and did not want to do too much at that time, in spite of verbal encouragement from the nurse, the treating PT, and the SPT; however, he agreed to an initial evaluation. The PT and SPT then took a subjective history and obtained objective measurements in order to obtain the patient's baseline level (Tables 1 and 2). He performed a sitting-to-and-from-standing transfer with min A with a gait belt and a RW, but required many verbal cues to maintain his NWB status on his left toes and to bear weight only through his heel as prescribed by his surgeon (e.g. "Remember to only push through your left heel" and "Try not to lean forward so much so you can keep the weight off of your toes").

Because SF demonstrated overall good range of motion and strength in his upper and lower extremities (with the exception of the left ankle), interventions were focused on improving functional mobility and maintaining strength during the following two visits (Table 3). During the second visit, SF required moderate assistance (mod A) for bed to and from chair transfers due to being unable to maintain his NWB status, even with verbal cueing. He stated that he wanted to try walking with a RW, so the SPT provided mod A with a gait belt as the patient initially elevated his left foot while ambulating in order to assess gait with an assistive device. SF continued to put weight through his left forefoot and required verbal and visual cues to remain NWB; he ambulated 7 feet before the PT and SPT decided that he was unable to continue without further risk of damaging the incision site. The PT and SPT expressed their preference of the patient being discharged to subacute rehabilitation (SAR), at which point the patient began to argue against the decision and was adamant in wanting to ambulate so that he could qualify for acute rehabilitation, which involves three hours of intensive interdisciplinary care per day.

As the patient continued to express the desire to try walking again, both therapists

analyzed the information obtained from the second visit. Both deliberated over possible options that would accommodate SF's desires while simultaneously keeping him safe. The PT suggested that the patient try ambulating while wearing an off-loading shoe, which has an elevated heel that is designed to relieve metatarsal pressure and prevent the forefoot from making contact with the ground while walking to optimize healing (Appendix B).[23,24] SF agreed to try the shoe and it was ordered for the next visit. He also was instructed in and performed seated exercises for hip flexion, knee extension, and ankle dorsiflexion and plantarflexion in order to maintain muscle strength and promote circulation.[25]

During the third visit, SF attempted to ambulate using the off-loading shoe, however he was not able to properly utilize it due to the foot drop preventing active dorsiflexion to place the raised heel flat on the floor; the added weight of the shoe also appeared to make this more difficult. This resulted in repeated attempts to bear weight on his forefoot despite verbal cues given to keep his foot elevated off of the ground. After another attempt issued in the same results, the PT and SPT instructed the patient to return to his chair to prevent damage at the incision site. He performed a fewer number of his seated exercises than requested due to reported frustration and appeared unmotivated after the ambulation attempts.

Wants and Needs

When defining a patient's wants, Jette *et al*. included their "goals for future functioning in their social, family, and work roles, and where they were willing or wanted to be following discharge."[1] During the initial evaluation, SF reported his overall goals of wanting to return home and to return to his prior level of function. He also reported his previous positive experience with the hospital's acute rehabilitation unit after his CVA and expressed a strong desire to be placed there after discharge. The PT and SPT acknowledged these statements and utilized them along with the examination findings to develop an initial plan of care. Because he showed adequate strength and hip, knee, and ankle ROM, the PT and SPT judged that it would be reasonable to allow SF to attempt ambulation for gait assessment. However, after multiple attempts and being unable to follow his NWB status, it was deemed that the need to prevent further damage to the incision site outweighed the patient's personal desires. The physical therapists often had to repeat their clinical reasoning to the patient as to why he was unsafe for gait training, though he continuously persisted on more ambulation attempts, insisting that he would "get better with more practice."

Ability to Participate

"Ability to participate" is defined as "the ability to actively take part in, direct, and share responsibility for one's care and outcomes."[1] This also includes a patient's own motivation.[1] The patient stated he was highly motivated to participate in therapy with the thought of being discharged to acute rehab. On the other hand, the patient's physical ability to participate, as seen with his level of functioning and disability, revealed that he was not appropriate for that discharge destination. After the therapists explained their preference for discharge to SAR and their clinical reasoning behind it, SF had a significant decrease in motivation to participate in therapy.

Context of Life

Jette *et al*. defined this construct as "the physical, social, and attitudinal environment in which the patient lived his or her life," which deeply involves the patient's support network of family and friends and any

Table 1: Seated active range of motion measurements at initial evaluation

Action	Left	Right
Shoulder flexion	0°-180°	0°-180°
Elbow flexion	0°-137°	0°-137°
Elbow extension	137°-0°	137°-0°
Hip flexion	90°-119°	90°-122°
Knee extension	90°-0°	90°-0°
Knee flexion	0°-124°	0°-129°
Dorsiflexion	0°-0°	0°-15°
Dorsiflexion (Passive)	0°-15°	0°-19°
Plantarflexion	0°-36°	0°-43°

Table 2: Seated manual muscle test results at initial evaluation

Action	Left	Right
Shoulder flexion	5	5
Elbow flexion	4+	4+
Elbow extension	4+	4+
Hip flexion	4+	4+
Hip extension	3	3
Knee extension	5	5
Knee flexion	5	5
Dorsiflexion	2+	4+
Plantarflexion	4+	4+

Table 3: Physical therapy interventions performed during subsequent visits

	Visit #2	Visit #3
Bed mobility	Mod IND	Mod IND
Sit to stand w/RW	Min A	Min A
Stand to sit w/RW	Min A	Min A
Bed to chair w/RW	Mod A	Mod A
Chair to bed w/RW	Mod A	Mod A
Gait Training w/gait belt & RW	Mod A, 7 ft.	Mod A, 6 ft.
Seated Hip Flexion	2 sets, 15 reps	1 set, 10 reps
Long Arc Knee Extension	2 sets, 15 reps	1 set, 10 reps
Ankle Pumps	2 sets, 20 reps	1 set, 15 reps

architectural barriers at home and in the community.[1] SF had reported living in a one-story home with his sister, who was working full-time and could only provide intermittent assistance to SF at home. Neither SF nor his sister reported any nearby family or friends who could also provide assistance. Furthermore, SF has a history of alcohol abuse, which his sister stated as being one of her worries when she is not at home with him.

Therapist Experience, Opinion Sharing, Health Care Regulations

The treating physical therapist had about 2 years of clinical experience and the student physical therapist was in his first clinical internship at the time this report was conducted. Although it has been reported that therapists with less experience tend to provide more conservative discharge recommendations and rely more on the opinions of other team members,[1,4,6] the data gathered from each visit made it very clear that SAR was the best option for him. This opinion was confirmed when shared with the case manager and the patient's nurse, who fully agreed with our recommendation. Jette *et al*. also explains how discharge recommendations and services could be affected by the facility's regulations and resources or the patient's insurance;[1] SF, however was insured under Medicare, which made reimbursement available for him no matter which setting he went to.

Recommended Discharge Destination

Although the initial impression of the patient suggested the possibility of being discharged to acute rehab for intensive interdisciplinary care, the data gathered during subsequent visits, along with the sharing of opinions with the nurse and case manager, accentuated the need for the patient to be discharged to subacute rehabilitation. The attending physician, as well as the patient's sister, agreed with our recommendation and the patient was discharged to a SAR facility.

Discussion

Because the process of clinical decision-making for discharge purposes is so complex and involves many factors and health care professionals,[1,2,9] the utilization of a model to improve its efficiency was used. This case report found that the implementation of the theoretical model for discharge decision making (Jette *et al*.) was a useful tool in the decision-making process for discharge recommendation for a 63-year old male with foot drop status post great toe amputation. Focusing on the four main constructs of a patient's functioning and disability, wants and needs, ability to participate, and context of life all provided the vital information needed to establish a foundation for discharge recommendation. For the case of SF, all of these constructs were found to be deeply interrelated with one another and had direct effects on the therapists' decisions throughout the plan of care. These constructs also accounted for factors involved with clinical decision-making previously found by Smith *et al.*[2]

SF's report of his previous positive experience in the acute rehabilitation unit certainly had an effect on the initial impression of the therapists. Due to the favorable results of his initial examination, the PT and SPT considered that acute rehabilitation was a possibility for him and projected that the patient's request to attempt ambulation could be carried out under the safety measures of using a gait belt and rolling walker. However, SF's level of functioning and disability was immediately recognized as he was repeatedly unsuccessful in following verbal cues to maintain his NWB status. The PT's experience was applied here when recommending the use of an off-loading shoe in order to meet both the patient's

wants and the need for safety. Nevertheless, SF's condition of foot drop only inhibited the proper use of the shoe in addition to the patient not following verbal cues to keep his entire foot elevated off the floor.

SF continued to insist that "maybe things will be different if we keep trying right now," expressing his high level of motivation, but a second attempt only resulted in decreased performance due to fatigue. Along with motivation, the definition of "ability to participate" also includes the ability to learn and apply knowledge.[1] The PT and SPT needed to comprehensively explain the risks of repeated attempts possibly causing a rupture of the suture at his incision site, which could increase the risk of infection and could result in another surgery, increased length of stay in the hospital, and increased costs. With this explanation, he began to show some understanding, which confirms the importance of thorough education for the patient in order to help them recognize the risks to their health.

The context of SF's life was also a key factor in making the final discharge recommendation. The patient's history of alcohol abuse and his sister's concern for his behavior when she was not at home further validated the final discharge decision. His sister also reported that he did not adhere to the use of his AFO each day, which could possibly extend to not adhering to other prescribed care such as a home exercise program or home-based physical therapy. This information was also shared with the nurse and case manager, who, in addition to the patient's sister and his attending physician, confirmed that receiving extended supervision and care in subacute rehabilitation would be the best option for SF in order to prevent adverse effects such as those previously mentioned.[8]
Several limitations were encountered during this case report. Because this was a single-subject case report, it cannot be directly applied to the general population. Also, standard procedure for goniometric measurement of hip flexion, knee flexion, and knee extension AROM requires the patient to be in the supine position.[16] Because the patient in his chair and did not want to transfer into his bed, these measurements could not be performed appropriately. For the same reason, manual muscle testing of hip extension could not be properly performed in supine.[19] Additionally, SF exhibited good strength in his hip and knee flexor musculature during the initial evaluation, so it is unknown as to why the patient did not use hip and/or flexion to keep his foot elevated even with repeated verbal cues. Perhaps if different methods were employed to facilitate the use of these motions, it is possible that SF would have been able to ambulate with a rolling walker while maintaining his NWB status. Along with observing ambulation distance, an outcome measure for balance could also have been used to support this case. Lastly, follow up was not able to be performed for this case report to determine the patient's status and outcomes after being discharged to subacute rehabilitation.

The findings of this case report support the use of Jette *et al*'s theoretical model of discharge decision making in improving the efficiency of the decision-making process. Although the patient's personal wants were inconsistent with his function and disability, ability to participate, and life context, the physical therapists were able to exercise skilled clinical reasoning to recommend the appropriate discharge setting through the use of Jette *et al*'s model of discharge decision making. Use of this model also emphasized the importance of the inclusion of the patient and health care professionals and the need for effective teamwork. Though this was not the patient's first choice, everyone involved in the process reached a consensus that would better the patient's health and

rehabilitation. The author would highly recommend that further studies be performed to establish the model's validity and reliability.

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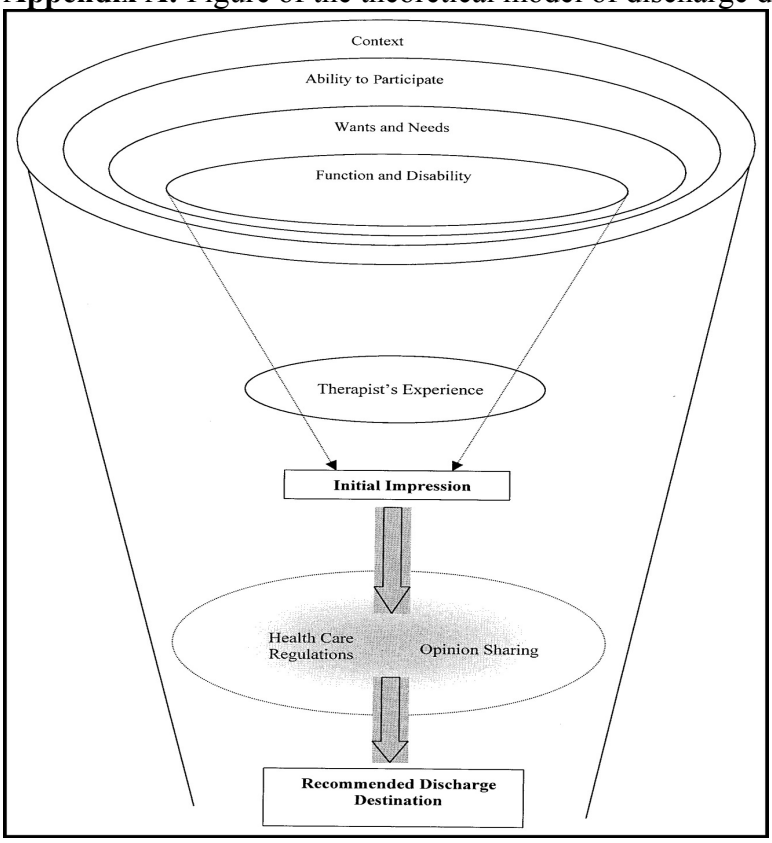
Appendix A: Figure of the theoretical model of discharge decision making.[1]



Appendix B: Off-loading shoe

(source: http://www.darcointernational.com/orthowedge)