

# Functional recovery of hip fracture patients

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## ABSTRACT

Hip fractures are common in the older population and are associated with loss of independence as well as high morbidity and mortality. Health service utilization is markedly increased for the first year following hip fracture. Returning hip fracture patients to their pre-fracture function requires a multi-disciplinary approach coordinated across multiple settings. Hip fracture care shifts from a medical model of care in the initial postoperative period to a functional model of care to improve recovery and finally a preventative model of care to avoid further fractures through fall prevention and osteoporosis management.

Rehabilitation plays a significant role in improving functional recovery of patients in all stages of care - through encouraging early postoperative mobility to secondary prevention using exercise and balance activities. Clear communication among disciplines and across settings, using a structured treatment plan with goals tailored to patients' unique needs and involving the patient and their family in treatment decisions is key to a successful recovery. Patients, their families and/or their caregivers and their environment need to be considered when determining appropriate options for care delivery and care transitions.

Currently, common barriers to delivering such care are inadequate rehabilitation resources to provide timely and adequate services to the patient, uncertainty about what constitutes best rehabilitation practices, lack of communication amongst disciplines and across treatment settings and heterogeneity in describing current treatment practices. This toolkit represents an initial step in setting the framework to provide best care for hip fracture patients.

## Introduction

Hip Fractures are serious injuries that occur commonly among older frail adults. These patients frequently have concomitant medical conditions including dementia that increase the complexity of care that is required. As the majority of hip fractures occur as a result of a simple fall from a standing height, most seniors who sustain a hip fracture are ambulatory prior to their fracture. Returning patients to their pre-fracture function and maximizing their independence is the goal of treatment.

Best rehabilitation management for hip fracture involves a multidisciplinary approach that starts on admission to the Emergency Room. This approach will increase the likelihood that patients are able to return to their pre-fracture functional status and living environment. The following sections are included in this document to provide a context for rehabilitation:

- Evidence to support rehabilitation
- Acute management
  - Early mobility
  - Adequate Pain Management
  - Early and Continuous Transition Planning
- Sub acute management
- Post acute management

## Evidence to support rehabilitation

Although rehabilitation is seen as integral to recovery following a hip fracture, evidence is limited as to the specific program content that is necessary to optimize recovery (ref 2 recent Cochrane reviews). There appears to be three distinct periods of recovery that have been examined and discussed in recent literature:

**Acute** – From time of fracture to 5-7 days postoperatively

**Sub-Acute** – After 5 days postoperatively up to 90 days postoperatively

**Post- Acute** – 90 days postoperatively up to 1 year after fracture

Much of the research in the hip fracture population has focused on the acute perioperative period and there appears to be consensus on what elements of care should be included in this phase of recovery (SIGN guidelines), with a focus on early mobility. However, there is much less evidence or consensus regarding the optimal management of patients in the sub-acute rehabilitation period, which can vary in length dependent upon the patients' pre-fracture status and postoperative course. Further, there does not appear to be a 'best' setting for sub-acute

recovery to occur, with benefits seen from both home and institutionally-based models of rehabilitation delivery (Cochrane and others). There is also limited evidence that patients with impaired cognition are able to respond to rehabilitation, although overall recovery may be slower and not reach similar levels as those without cognitive issues (ref Muir, Chydk, Allen's SR).

Interestingly, there is more evidence for the positive impact of rehabilitation in the post-acute period after the fracture has healed (Sherrington, Binder, Feehan). Although much is still to be learned about the optimum design of these post-acute programs in terms of content, intensity, frequency and duration, it does appear that there are no harms and potential benefits associated with programs that contain resistance training, balance and lifestyle modifications to allow patients to attain maximal recovery following hip fracture.

### **ACUTE MANAGEMENT**

Despite limited evidence, there appears to be clinical consensus that the following elements are critical in the early phase of recovery:

**Early mobility:** All treatment choices (e.g. surgery, pain management) should be directed to optimizing the patient's ability to mobilize as soon as possible after surgery. Mobility is not just the responsibility of the rehabilitation team, but should be incorporated into all aspects of care delivery (e.g. toileting, transfers, avoidance of IV lines where possible; pressure sore prevention; fall risk assessment and prevention).

**Adequate Pain Management:** Patients must be able to tolerate at least daily rehabilitation sessions and should be encouraged to be out of bed as much as possible. This will only be tolerated if pain is well managed.

**Early and Continuous Transition Planning:** Discharge planning needs to start on admission and involve the patient and their caregivers/family as well as a multidisciplinary team with an initial goal of returning the patient to their pre-fracture residence whenever possible. External agencies who will receive these patients should also be involved in these early discussions as necessary. Consideration needs to be given to:

#### ***Pre-Fracture Factors:***

Patient – Morbidity, pre- cognition, pre-fracture functional status

Psychosocial - Availability of caregivers/family to provide care/support; Ability to participate in pre-fracture social activities to prevent social isolation

Environmental –Home environment (stairs, access for walker), access to community or needed services (e.g. shopping, banking, etc).

#### ***Post -Surgical Factors:***

Weight-bearing status

Post-surgical cognitive and medical status

Access to rehabilitation facilities/resources/services

Osteoporosis: assessment / consultation for prevention of secondary fracture

## **Preoperative**

- 1) Determination of patients' pre-fracture physical, current medical and cognitive status (including current medication profile) from patient or family/caregiver to:
  - a. Inform surgical decision-making – Those in frail health or with impaired cognition should receive surgical fixation to allow immediate weight-bearing as tolerated postoperatively  
  
Non or feather weight bearing may be acceptable in younger, healthier patients, but should not be considered usual practice.
  - b. Facilitate transition planning – Engage the patient and family in looking at post-discharge needs/management using validated tools as able to standardize planning approach and decision making  
  
Consider patient's physical, medical and cognitive status as well as social supports and previous living arrangements/environment.
- 2) Adequate pain management - Preoperative pain control will facilitate postoperative pain control and expedite the mobility process. (there is some evidence for preoperative nerve blocks).
- 3) Surgery within 24-48 hours of admission to reduce morbidity

## **Acute Postoperative**

### **1) *Early Mobility***

Patients should be mobilized as soon as medically stable (i.e. within 12-24 hours of surgery).

Mobility can start with sitting / dangling in very frail patients, but should progress to standing within 24 hours of surgery.

Weight-bearing status should be 'as tolerated'; if not, discuss with surgeon regarding ambulation prognosis

Patients should receive at least daily physical and occupational therapy including weekends regardless of cognitive status.

Rehabilitation sessions should focus on gait quality, walking endurance, transfers, ADL and safety.

Treatment goals to progress the patient's ambulation, transfer and ADL status should be set daily based on their pre-fracture capacity.

Patients should be up in a chair for meals whenever possible and should spend as much of day as tolerated out of bed to encourage cognitive alertness and promote activity and independent self-care.

Independence in self-care and hygiene should be encouraged to the degree possible with assistance provided as necessary. All care staff should be involved in encouraging mobility/independence in toileting and transfers, not just rehabilitation specialists.

A high protein diet and adequate hydration should be encouraged so that patients can tolerate aggressive rehabilitation. (?? Vita D supplementation – some clinical consensus/weak evidence to suggest that Vita D may be beneficial for sarcopenic individuals).

### **2) Adequate pain management**

Rehabilitation sessions and pain management should be coordinated to maximize the patient's ability to participate in rehabilitation.

Pain management strategies should avoid the use of IV lines whenever possible (i.e. PCA; continuous nerve blocks).

Pain should be assessed regularly in all patients, including those who cannot communicate verbally (use of non-verbal pain scales is encouraged) to ensure pain is consistently controlled.

### **3) Continuous Transition Planning**

There should be daily assessments of patient's progress to determine needs for post-acute rehabilitation and prevent delays in transfers to rehabilitation/home or other care environments.

Functional assessments done at 2 days postoperatively using standardized tools may assist in determining appropriate discharge destinations (refs and add to tool box).

Commence discussion with transfer facility to prevent delays and facilitate communication among care providers. Continue to involve patients and their families in the discussion.

Current evidence on care transitions has emphasized the need for clear communication between facilities and among disciplines (use BOOST info; Naylor/bowles articles). Strategies to improve care transitions can include the use of:

- a) Standardized discharge summaries to ensure complete information on patient's medical (including osteoporosis, fracture risk, medications), rehabilitative, and cognitive progression, during the hospital stay and current status at time of discharge.
- b) Provision of information on patient's pre-fracture status (function, cognition, medical) as well as the pre-fracture living environment and social/caregiver support.
- c) A case manager who acts as a conduit among health care providers as well as with the patient and their family
- d) Consultation with patient and family about reducing risk of fracture: falls prevention, lifestyle modifications, adherence to medication

## **SUB-ACUTE REHABILITATION**

**(5-7 days postoperatively up to 90 days postoperatively)**

Once patients become medically stable, the focus of care shifts from a medical model of care to a functional model of care aimed at improving patients' independence in self-care, transfers and ambulation to allow them to return to their pre-fracture living arrangement as the hip fracture continues to heal. This may involve transition to rehabilitation settings (e.g. rehabilitation wards, free-standing rehabilitation facilities), discharge home with appropriate medical, rehabilitation and social supports or continuation of care in the same setting with a focus on participation in rehabilitation. Examples of appropriate care settings include:

In-patient Rehabilitation – Inpatient rehabilitation may be offered for varying lengths of time to patients who are not yet ready to return to their home environment. This form of rehabilitation may occur in free-standing facilities or in hospital wards that offer lower acuity care with a focus on rehabilitation rather than medical management (ie Geriatric Orthopaedic Rehabilitation Units)

Community-Based Care – Where adequate Home Care services are available, recovery at home should be considered a viable option for sub-acute rehabilitation. Careful assessment of patients' medical, rehabilitative and social needs should be considered in determining if this option is appropriate and encouraged where possible.

Supportive Living Environments – Careful assessment of patients who were living in supportive living environments prior to their hip fracture (e.g. those living in lodges, daily assisted living environments, nursing homes, etc.) should be undertaken to determine if patients are able to return to a similar level of care.

Services (medical, rehabilitative) can vary widely among these settings; thus standardized transition planning should be used to ensure that all facets of patient care are considered prior to the patient returning to the facility.

Caregivers from these facilities should also play a role in care transition planning to avoid preventable re-admissions back to the surgical hospital. The patient should return to the facility at a time when both facility staff and patient will be able to manage the patient's needs, including providing appropriate levels of rehabilitation.

Consideration should be given to providing augmented rehabilitation to these individuals if rehabilitation resources are not adequate, including that provided by external resources (e.g Home Care).

**Key to the success of the patients' recovery is the opportunity for ongoing intensive rehabilitation rather than the setting in which the rehabilitation takes place.**

Hip fracture patients often have multiple medical issues, including impaired cognition and are frequently de-conditioned, giving them very little reserve for recovery. Effective rehabilitation can

be offered in multiple environments depending on patient needs and resource availability, but is integral to promote maximal functional recovery after hip fracture.

Sub-acute rehabilitation (i.e. starting at 5-7 days postoperatively) should be available to all patients who were ambulatory prior to fracture regardless of cognitive / medical status. Those with impaired cognition and/or complex medical/social needs may require longer stays with more prolonged rehabilitation prior to transitioning back to pre-fracture living arrangements.

The intensity and frequency of rehabilitation should be increased as the patient will tolerate during this sub-acute period of recovery. Rehabilitation should be multi-disciplinary (SIGN, BOA, Cochrane reviews) - the following elements can be considered to optimize patient care:

Use of a clinical pathway to promote standardization of care and continual progression of rehabilitation program (Stenvall, McGilton).

Regular team meetings to discuss patient progress, barriers to discharge and strategies to overcome known barriers

Secondary prevention should be a component of sub-acute management – osteoporosis, fall risk and mitigation strategies

Nutritional supplementation – High protein diets with vitamin/mineral (Vitamin D/calcium) supplementation should continue.

Patients will have varying needs and require this intensive rehabilitation for varying periods of time; thus assessment of their ability to return home with support to continue recovery should be ongoing throughout this period. Some patients will be ready to return home within one-two weeks with appropriate home support while others will need to be sent to slower stream rehabilitation that might continue up to three months post-fracture.

Determining the patients' stream of recovery early in the sub-acute phase will reduce the anxiety for the patient and their family and assist in determining the appropriate intensity of rehabilitative care.

Fast-Stream – Home within 5-14 days with appropriate home rehabilitation/medical services.

Some patients who are younger, healthier, and without cognitive issues may be able to transition home with homecare or family support following an acute hospital stay.

These patients should receive education and information on discharge about secondary prevention, ongoing rehabilitation and understand how/who to follow up with following discharge.

This form of rehabilitation can also for those where the Home Care services and family/caregiver support in the pre-fracture environment is available.

This can include those admitted from long-term residential settings provided that rehabilitation services are available at an appropriate level at the setting or can be provided by an external agency (e.g. Home Care).

Home Care should be provided based on patients' needs rather than a set time period, but there should be clear criteria of what the treatment goals are, so that treatments are neither un-necessarily prolonged nor inappropriately stopped. Further services should only be provided by the various disciplines as needed, so ongoing communication amongst caregivers is important.

Usual Stream – Home within 14-28 days with appropriate home support at discharge.

Many hip fracture patients likely fall within this category and represent those patients who will respond to intensive rehabilitation and are likely to be able to be safe ambulators in their home and/or in the community.

These patients are able to tolerate intensive rehabilitation, up to 2 times daily, with continual assessment and progression of the rehabilitation program.

The program should be multi-disciplinary with all team members understanding their role and having a clear focus on discharge as appropriate for each patient in the most timely manner.

Criteria for discharge should be patient-focused dependent upon the patients' and families' needs (e.g. community or home ambulatory; independence on stairs necessary, etc.).

These patients should also receive education and information on discharge about secondary prevention, ongoing community-based rehabilitation and understand how/who to follow up with following discharge.

Home Care services should be set up as needed prior to discharge with clear communication amongst care providers and the patients and their families.

Slow Stream – Home within 28-90 days with appropriate home support at discharge.

For medically complex patients including those who have cognitive issues or who were very de-conditioned at the time a fracture, a lower intensity and longer duration program should be made available.

For those on appropriate protected weight-bearing status, there should be continual assessment as to when the status can be upgraded to 'as tolerated' to advance the progression of recovery.

Although lower intensity, there should still be a clear progression of treatment with the multidisciplinary team ensuring that the patient is working at their maximum potential throughout the program. The goal should be to offer in-patient care for the shortest amount of time necessary.



Where possible, some of this rehabilitation may be offered in the home environment after a period of inpatient rehabilitation.

Ongoing assessment of these individuals needs to occur to determine the likelihood of a successful transition into a community environment. If it becomes apparent that the patient is unlikely to be successful, early interaction with those responsible for finding alternative levels of care will prevent prolonged delays in patient placement.

Criteria for discharge should be patient-focused dependent upon the patients' and families' needs (e.g. community or home ambulatory; independence on stairs necessary, etc.) and support available in the community environment.

These patients should also receive education and information on discharge about secondary prevention, ongoing community-based rehabilitation and understand how/who to follow up with following discharge.

Alternative Levels of Care – Unable to return to the pre-fracture home environment.

Some patients, despite best efforts, will be unable to return to their home environment because their medical needs are too great or their home environment inappropriate for them to safely reside following a hip fracture. This decision should be made after multidisciplinary evaluation/treatment and in discussion with the patient and family/caregivers.

These patients should still receive rehabilitation to maximize their recovery and return to the highest possible function.

Early identification of these individuals (after careful assessment of their recovery potential) will prevent delays in finding appropriate post-discharge care.

These patients can be moved into transitional beds or potentially sent home temporarily with appropriate home support prior to moving into a permanent care environment.

Families and patients should be involved in the decision for placement, but should also be made aware of health resources and that optimal placement may require some transitional moves to ensure that the patient is not detaining access to the high acuity acute care bed.

## **POST-ACUTE REHABILITATION**

Once the fracture has healed, consideration should be given to having patients attend community-based exercise program to optimize their physical conditioning.

There is evidence that fall risk can be reduced and physical function improved through programs that involve resistance training and balance work (Feehan, Sherrington, etc.).

Programs vary in intensity, duration and frequency, but most appear to last six-weeks to three-months and are delivered in community settings.

There may be added value to these programs as they offer further opportunities to educate the patient and their family on fall prevention, bone health management and can also provide important social contact for the patient.

## **CURRENT BARRIERS TO OPTIMAL REHABILITATION**

In discussions with groups across the country, common barriers to delivering best care were identified. First and foremost, there was a clear concern about the availability of adequate resources/settings in which to provide optimal rehabilitative care. This clearly needs to be addressed in order to provide consistent best practices across the country. Further, there was some concerns raised that there was higher priority rehabilitative focus on other patient groups (e.g. Total Joint Arthroplasty patients) that detracted from the ability to offer timely and adequate rehabilitation to the hip fracture patients.

Secondly, there is a clear need for changes in care that can optimize recovery through provision of best practices. This includes education of care providers so that patients are not unnecessarily delayed in their recovery (e.g. protected weight bearing status in frail elders, reluctance to discharge patients home, appropriate management of 3 D's so that patients are not sent to residential care, but instead return home). This also includes system changes so that there are not delays in surgical management, delays in changing the focus of care to intensive rehabilitation, etc).

Thirdly, communication across disciplines and settings remains fragmented in many instances and care could be substantially improved if there was standardization of communication requirements at each transition. These communications should include the patient and their family as partners in care, so that there is clear knowledge about who should be contacted when problems arise on return home.

Finally, there appears to be wide diversity in terminology used when describing rehabilitation processes and environments in which patient receive care both within and between provinces. Standardization of terms or standardized definitions would assist greatly in allowing better communication at the patient/family, care-giver, and system levels.

## **SUMMARY**

Hip fractures are common injuries that can have substantial deleterious effects on the quality of life of the frail elderly population. With an global aging population, determining methods to provide the best care that will optimize outcomes and utilize finite health services in the most effective and efficient way is paramount. A structured framework such as described in this toolkit is critical to allow us to evaluate current care standards and determine areas to improve delivery of care.