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# TAILORING TREATMENT FOR ELDERLY PATIENTS WITH DISPLACED FEMORAL NECK FRACTURES: A NARRATIVE REVIEW.

*Sunil Kumar*
*Consultant Orthopedic Surgeon, Department of Orthopedic, Shiva Ortho Centre, Bihar Sharif, Bihar, India.*



## ABSTRACT
Displaced femoral neck fractures in the elderly pose significant medical and social challenges due to their association with high morbidity, mortality, and healthcare costs. The increasing incidence of these fractures, driven by global population aging and osteoporosis prevalence, underscores the urgent need for effective management strategies. This review aims to comprehensively analyze the management strategies for displaced femoral neck fractures in elderly patients, focusing on evaluating surgical treatments and rehabilitation methods. The review synthesizes evidence from studies assessing surgical interventions, rehabilitation strategies, and patient outcomes. Surgical management options, including THA and hemiarthroplasty, are evaluated in terms of functional outcomes, complication rates, and long-term durability. Rehabilitation strategies, such as home-based versus institutional-based rehabilitation, are analyzed for their impact on functional recovery and quality of life. Patient-specific factors influencing treatment decisions and future directions in fracture management are also discussed. The findings of the review have implications for enhancing clinical practice and improving outcomes in elderly people with displaced FNFs. Understanding the comparative effectiveness of surgical interventions and rehabilitation strategies can guide healthcare professionals in personalized treatment planning, ultimately leading to better patient outcomes and quality of life. Clinical decision-makers can benefit from the review's insights when choosing surgical techniques and rehabilitation plans for senior patients with displaced femur neck fractures. These results can also be used by policymakers to develop protocols and guidelines that will optimize fracture management techniques and enhance the quality of care provided to this susceptible population.

***Keywords:*** *Displaced femoral neck fractures, Elderly Patients, Surgical Management, Rehabilitation Strategies, Outcomes.*
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*Corresponding Author: Sunil Kumar**
*Email: sunilkmr@gmail.com*
*Consultant Orthopedic Surgeon, Department of Orthopedic, Shiva Ortho Centre, Bihar Sharif, Bihar, India.*

## INTRODUCTION
Displaced femoral neck fractures (FNF) in the elderly represent a significant medical and social issue, given their association with high morbidity, mortality, and substantial healthcare costs. The incidence of these injuries is on the rise, primarily due to the increasing age of the global population and the prevalence of osteoporosis among the elderly. The impact of such fractures extends beyond the immediate physical injury, affecting patients' mobility, independence, and quality of life. Moreover, the risk of mortality in the first year following a hip fracture is significantly increased, highlighting the severity of this condition [1].

The management of displaced FNFs in elderly patients is fraught with challenges. The decision-making process for treating these fractures is complex, requiring consideration of the patient's age, comorbidities, level of activity, and potential for recovery. Surgical intervention is the primary treatment modality, with options including total hip arthroplasty (THA) and hemiarthroplasty. Each of these procedures has its advantages and potential complications, necessitating a personalized approach to treatment.

Rehabilitation post-surgery presents its own set of challenges, particularly in determining the most appropriate setting. The feasibility and success of home-based rehabilitation (HBR) versus institutional-based rehabilitation (IBR) depends on various factors, including the patient's pre-fracture living situation, functional status, and the availability of support systems [2]. Furthermore, the increasing preference for less invasive treatments and the patient's desire for rapid return to pre-fracture functionality complicate the management strategies for these injuries.

Given these complexities, managing displaced FNFs in older individuals requires a multidisciplinary approach, integrating the expertise of orthopedic surgeons, geriatricians, physiotherapists, and social workers. The goal is to not only address the immediate injury but also to implement strategies that will improve long-term outcomes and quality of life for this vulnerable patient population [3].

The review aims to offer a thorough analysis and synthesis of the management strategies for displaced FNFs in elderly people, focusing on evaluating the effectiveness and outcomes of various surgical treatments and rehabilitation methods. It seeks to address key questions regarding the comparative effectiveness of total hip arthroplasty versus hemiarthroplasty, the impact of rehabilitation settings on patient recovery, the role of patient-specific factors in guiding treatment and rehabilitation decisions, and the overarching challenges faced in managing such fractures in the elderly population. This comprehensive approach aims to identify optimal treatment protocols that enhance recovery, improve quality of life, and cater to the individual needs of elderly patients, thereby guiding healthcare

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professionals in making informed decisions to improve care outcomes for this vulnerable group.

## METHODOLOGY

The methodology employed in this narrative review article aimed to comprehensively analyze and synthesize the management strategies for displaced FNFs in elderly patients, focusing on evaluating the effectiveness and outcomes of various surgical treatments and rehabilitation methods. With the use of electronic databases like PubMed, MEDLINE, Embase, and Google Scholar, a thorough literature search was carried out. A combination of keywords and medical topic headings (MeSH) about 'displaced femur neck fractures', 'geriatric patients', 'surgical treatments', and 'rehabilitation strategies' were employed in the search strategy. Only articles published in English between the year 2005 and the present were included in the search.

Articles were included if they met the following criteria, 1. Studies evaluating surgical management options (THA, hemiarthroplasty) and rehabilitation strategies (home-based rehabilitation, institutional-based rehabilitation) for displaced FNFs in elderly patients. 2. Randomized controlled trials, prospective cohort studies, retrospective studies, systematic reviews, and meta-analyses. 3. Studies reporting on outcomes such as functional recovery, quality of life, mortality, complications, and healthcare utilization.

Case reports, editorials, letters, and conference abstracts weren't considered articles. Studies not relevant to displaced FNFs or not focused on older patients. Research with insufficient reporting of results or methodology.

Two reviewers separately extracted the data using a standardized form. Study features (author, year, study design), patient demographics, surgical and rehabilitative therapies, outcomes of interest, and significant findings were among the data that were extracted. Any differences in the data extraction process were settled by consensus and debate.

The synthesized data were analyzed thematically to identify patterns, trends, and areas of consensus or controversy in the literature. Subgroup analyses were conducted where appropriate to explore differences in outcomes based on factors such as surgical approach, rehabilitation setting, and patient-specific characteristics.

Using validated instruments like the Newcastle-Ottawa Scale for observational studies and the Cochrane Risk of Bias Tool for randomized controlled trials, the quality of the included studies was evaluated. The risk of bias in a variety of categories, such as reporting, attrition, detection, performance, and selection, was graded for studies.

## DISCUSSION

### Surgical Management

In the realm of orthopedic surgery, managing displaced FNFs in elderly patients often involves a choice between two primary surgical interventions: total hip arthroplasty and hemiarthroplasty. These options are distinguished not only by their surgical approach but also by their implications for patient recovery, functional outcomes, and quality of life.

THA involves the replacement of both the femoral head and the acetabulum, making it a comprehensive solution for restoring hip function. This approach is particularly beneficial for active elderly patients or those with pre-existing joint issues, as it tends to offer greater durability and a lower risk of revision surgery compared to hemiarthroplasty. Hemiarthroplasty, on the other hand, entails the replacement of only the femoral head, preserving the natural acetabulum. It's often considered for less active patients or those with significant comorbidities, due to its shorter operative time and reduced surgical stress.

The advantages of THA over hemiarthroplasty, particularly in terms of hip function and quality of life, have been substantiated by various studies, including the four-year follow-up study by Hedbeck et al. This research highlighted that patients receiving THA reported better hip function, as measured by the Harris hip score, and a higher quality of life compared to those who underwent hemiarthroplasty. These benefits were observed not just in the short term but also persisted and even increased over time, emphasizing THA's role in providing a more durable and satisfactory outcome for patients [4].

When deciding between THA and hemiarthroplasty, several patient-specific factors must be considered to tailor the surgical approach to individual needs. These factors include the patient's overall health status, cognitive function, and anticipated activity level post-surgery. For instance, THA might be more suitable for patients with a higher level of cognitive functioning and those who are more likely to resume an active lifestyle, as these individuals can better manage and benefit from the more complex rehabilitation associated with THA. Conversely, for patients with significant cognitive impairments or those with a relatively sedentary lifestyle, hemiarthroplasty may be preferred due to its simpler postoperative care requirements and reduced risk of dislocation.

Moreover, the choice between these surgical options is also influenced by the risk of postoperative complications, such as infection, dislocation, and the need for revision surgery. Given these considerations, a comprehensive preoperative assessment, including a detailed review of the patient's medical history, functional status, and social support system, is crucial for making an informed decision that aligns with the patient's health goals and quality of life expectations.

The management of displaced FNFs in the elderly involves a comprehensive surgical approach that encompasses pre-operative assessment, optimal timing for surgery, selection of the surgical treatment, consideration for the use of cemented prosthesis, and meticulous post-operative care.

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## Pre-operative Assessment

A thorough pre-operative assessment is critical for identifying any underlying medical conditions that may affect the surgical outcome. Lewis and Waddell (2016) underscore the necessity of a multidisciplinary team evaluation to optimize the patient's medical status before surgery, which can significantly impact the patient's recovery trajectory and overall prognosis. This assessment often includes cardiovascular evaluation, nutritional status, and cognitive function assessment to tailor the surgical and anesthetic approach accordingly [5].

## Time to Surgery

The timing of surgical intervention has been a subject of extensive research, with evidence suggesting that earlier surgery is associated with better outcomes. Lewis and Waddell (2016) highlight that surgery performed within 48 hours of injury can reduce the risk of complications and mortality [5]. This prompt intervention is crucial for minimizing the duration of immobility, thereby reducing the risk of venous thromboembolism, pressure ulcers, and pneumonia, which are common complications associated with delayed surgery.

## Surgical Treatment Options

The choice between hemiarthroplasty and THA is contingent upon the patient's functional demands, life expectancy, and the risk of dislocation. Liodakis et al. (2016) compare these options, noting that THA may be favored in more active elderly patients due to its lower dislocation rates and better functional outcomes [6]. However, the decision must be individualized, taking into account the patient's pre-fracture mobility and any comorbid conditions that might influence the surgery's success and the patient's recovery.

## of Cemented Prosthesis

The use of cemented prostheses in the surgical treatment of FNFs has been advocated for its immediate post-operative stability and reduced peri-prosthetic fracture risk. As Hoskins et al. (2017) suggest, cemented prostheses are especially beneficial in the elderly population, where poor bone quality poses challenges for implant fixation. The cemented technique is associated with lower post-operative pain and faster mobilization, essential factors for enhancing recovery in elderly patients [7].

## Post-operative Care

Post-operative care is pivotal in ensuring successful outcomes. This phase includes pain management, early mobilization, and prevention of complications such as infections and thromboembolic events. According to Hoskins et al. (2017), a multidisciplinary approach involving orthopedic surgeons, physiotherapists, occupational therapists, and nursing staff is crucial for addressing the multifaceted needs of the patient [7]. Rehabilitation starts immediately post-surgery, focusing on restoring mobility and preventing muscle atrophy and joint stiffness, thereby improving the patient's functional outcomes and quality of life.

The surgical management of displaced FNFs in the elderly is a complex process that requires a meticulous approach to pre-operative assessment, timely surgery, careful selection of surgical options, and post-operative care. By adhering to evidence-based practices as outlined in the literature, clinicians can optimize patient outcomes, enhancing recovery and quality of life for this vulnerable population.

## Rehabilitation Strategies

Rehabilitation following surgery for displaced FNFs in elderly patients is pivotal for functional recovery and achieving independence. The debate between home-based rehabilitation (HBR) and institutional-based rehabilitation (IBR) focuses on optimizing outcomes through personalized recovery plans. HBR allows patients to recover in a familiar environment, potentially enhancing psychological well-being and encouraging more personalized care. Conversely, IBR offers a structured setting with access to specialized rehabilitation facilities and professionals, which may benefit patients requiring intensive therapy.

Giusti et al.'s research sheds light on the feasibility and success predictors of HBR, underscoring the significance of patient choice and the presence of a supportive home environment [8]. Their study suggests that, for selected patients, HBR can be just as effective as IBR, if not more so, in promoting recovery and functional independence. Critical to this success is the availability of a supportive network that can assist with rehabilitation exercises and daily activities, alongside professional home visits. The study indicated that factors such as the patient's pre-fracture living arrangement, functional status, and the occurrence of delirium significantly influence the choice between HBR and IBR, with a notable emphasis on the predictive role of having relatives at home to support the patient's recovery.

The impact of the rehabilitation setting on patient outcomes has been a subject of considerable interest. HBR, by facilitating rehabilitation in a familiar setting, might offer advantages in terms of psychological comfort and customization of care, which are conducive to better functional outcomes. The study by Giusti et al. highlights that patients opting for HBR demonstrated a slightly lower functional decline and a higher rate of recovery during the follow-up period when compared to those who underwent traditional rehabilitation methods [8]. This suggests that HBR can be a viable and effective option for elderly patients with a conducive home environment and supportive family structure.

The choice between HBR and IBR should be tailored to the individual patient, considering their specific needs, preferences, and home environment. The decision-making process should involve a thorough assessment of the patient's physical and cognitive capabilities, the availability of a supportive home network, and the potential benefits of a structured rehabilitation facility. By

aligning rehabilitation strategies with patient-specific factors, healthcare professionals can optimize functional recovery and independence in elderly patients recovering from displaced FNFs.

## Alternative Approaches and Special Considerations

In the ongoing evolution of surgical strategies for managing fractures in elderly patients, alternative approaches such as primary knee arthroplasty (PKA) for distal femoral fractures offer promising results. This technique, particularly pertinent for certain types of fractures such as supracondylar and intercondylar fractures, presents an innovative solution that caters to the complex needs of the elderly demographic. Bell et al. study on PKA underscores its effectiveness in managing these specific fracture types. The study advocates for PKA as a viable treatment for type C and some type A supracondylar fractures in elderly patients, highlighting its potential to provide positive outcomes in appropriately selected cases [9]. This research supports the broader application of PKA, suggesting its inclusion in the spectrum of surgical options for complex distal femoral fractures.

Patient-specific factors play a crucial role in determining the most appropriate treatment pathway for elderly patients with displaced FNFs or other related injuries. These factors include, but are not limited to, underlying health conditions, previous surgeries, and the inherent risk of postoperative complications [10]. A comprehensive evaluation of these elements is essential to tailor treatment plans that minimize risks while maximizing the potential for recovery and rehabilitation.

For instance, a patient with osteoporosis may require a different surgical approach than one with robust bone density. Similarly, the history of previous surgeries in the affected area can influence the choice of procedure, necessitating a more cautious approach to avoid complications such as infection or prosthesis failure. Moreover, the overall risk of postoperative complications, such as thromboembolic events or delayed wound healing, must be carefully weighed against the potential benefits of the surgery [11]. This nuanced approach to patient care emphasizes the importance of personalized treatment strategies that consider the unique health profiles and needs of elderly patients.

The exploration of PKA and the consideration of patient-specific factors underscore the complexity of managing fractures in the elderly. By integrating evidence-based practices, with a deep understanding of individual patient characteristics, healthcare providers can enhance surgical outcomes and support the recovery process. This patient-centric approach not only addresses the immediate challenges posed by the fracture but also contributes to the long-term well-being and quality of life of elderly patients.

## Patient Outcomes and Quality of Life

The journey to recovery and the quest for quality-of-life post-displacement FNF surgery in elderly patients is a multifaceted challenge that encompasses not just the immediate surgical outcomes but also the broader vistas of functional recovery and long-term care needs. Understanding and enhancing these aspects are crucial for improving patient outcomes and quality of life.

Functional recovery post-surgery is pivotal. Successful outcomes hinge not merely on the surgical technique employed but equally on post-operative rehabilitation strategies. Studies highlight the significance of early mobilization and tailored rehabilitation programs in improving functional independence and reducing the risk of long-term disability [12]. These interventions are designed to address not only the physical dimensions of recovery but also the psychological aspects, fostering a sense of autonomy and resilience among patients.

The impact on health-related quality of life (HRQoL) extends beyond the immediate aftermath of surgery. The intricacies of coping with an FNF often manifest in diminished HRQoL, compounded by factors such as pain, reduced mobility, and the psychological strain associated with recovery and adaptation to potential lifestyle changes. The research underscores the correlation between timely, patient-centered care approaches and improved HRQoL outcomes, highlighting the importance of considering patient preferences, pre-fracture functional status, and comorbidities in care planning.

Strategies to optimize outcomes in this context involve a comprehensive, interdisciplinary approach that bridges surgical care with robust rehabilitation protocols. Effective pain management, prevention of complications (such as pressure sores and venous thromboembolism), and addressing nutritional needs are integral components of post-surgical care that significantly influence recovery trajectories [13]. Furthermore, engaging patients and their families in care decisions and setting realistic expectations play a critical role in aligning treatment objectives with patient values and goals, thereby enhancing satisfaction and outcomes.

Navigating the path to recovery and ensuring a quality life post-displacement FNF surgery demands a holistic strategy that transcends surgical intervention. It necessitates a concerted effort that encompasses effective pain management, personalized rehabilitation, and an overarching framework of patient-centered care. By adopting such an approach, healthcare providers can significantly impact the functional recovery and long-term well-being of elderly patients, ultimately leading to improved outcomes and quality of life.

## CONCLUSION

Managing displaced FNFs in elderly patients requires a multifaceted approach that integrates evidence-based surgical interventions and tailored rehabilitation strategies. This review has highlighted the complexities involved in treatment decision-making, emphasizing the importance of considering patient-specific factors and long-term outcomes. By synthesizing current evidence, this review provides valuable insights to guide clinical practice, optimize patient care, and inform future research directions. Ultimately, adopting a patient-

centered approach and leveraging interdisciplinary expertise is paramount in improving outcomes and enhancing the quality of life for this vulnerable population.

## Limitations

The review limitations include potential publication and selection biases due to its English-only focus and specific inclusion criteria, such as study design and time frame. Quality assessment methods lack detailed explanations, and human error in data extraction may exist. Heterogeneity among studies and the focus on elderly patients limit generalizability. Conflicts of interest, though declared absent, could still impact interpretation.

## Need for feature research

Further research is needed to compare long-term outcomes between THA and hemiarthroplasty for displaced FNFs, optimize surgery timing, assess pre-operative protocols, explore alternative surgical approaches like PKA, and evaluate the cost-effectiveness of rehabilitation strategies such as HBR and IBR.

## List of abbreviations

1. FNF: Femoral Neck Fracture
2. THA: Total Hip Arthroplasty
3. IBR: Institutional-Based Rehabilitation
4. HBR: Home-Based Rehabilitation
5. MeSH: Medical Subject Headings
6. HRQoL: Health-Related Quality of Life
7. PKA: Primary Knee Arthroplasty

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## Conflict of interest

The authors have no competing interests to declare.

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