



Postoperative Recovery and Rehabilitation: A Comparative Analysis of Mobility and Social Dependency After Gamma Nail Vs. Proximal Femoral Nail Surgery

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Abstract:

Background: The management of stable extracapsular fractures of the proximal femur challenges orthopedic practice, with postoperative recovery and rehabilitation outcomes being crucial for patient independence and quality of life. This study compares Gamma Nail and Proximal Femoral Nail (PFN) regarding mobility and social dependency post-surgery.

Methods: Fifty patients were retrospectively analyzed, divided into two groups based on the surgical intervention received. Mobility scores, social dependency scales, and pain levels were assessed at various postoperative intervals.

Results: The PFN group showed quicker improvements in mobility and reductions in social dependency, with notably less pain reported in the early postoperative period. Both interventions were effective, but PFN presented some advantages in facilitating rehabilitation.

Conclusion: While both Gamma Nail and PFN effectively manage stable extracapsular fractures, PFN may offer benefits in early postoperative recovery. Tailoring surgical choices to individual patient needs is essential for optimizing rehabilitation outcomes.

Keywords: Proximal femur fractures, Gamma Nail, Proximal Femoral Nail, postoperative recovery, mobility, social dependency.

Introduction

The management and rehabilitation of stable extracapsular fractures of the proximal femur post-surgery present a complex challenge that extends well beyond the operating room.¹ The journey towards recovery for patients undergoing Closed Reduction and Internal

Fixation (CRIF) with either Gamma Nail or Proximal Femoral Nail (PFN) is influenced by a myriad of factors. These factors range from the surgical technique employed to the inherent resilience and health status of the patient. Rehabilitation outcomes, characterized by

mobility and social dependency, are critical measures of success for surgical interventions.² This study aims to provide a comprehensive analysis of postoperative recovery and rehabilitation, comparing the effectiveness of Gamma Nail versus PFN in promoting patient mobility and reducing social dependency. By focusing on these outcomes, the paper sheds light on the broader implications of surgical choices and their impact on the quality of life and independence of patients post-surgery.³

Extracapsular fractures of the proximal femur, particularly in the elderly population, are not just a matter of surgical repair but a pivotal point that could determine the trajectory of an individual's remaining life. Effective management of these fractures goes beyond achieving radiological union; it encompasses ensuring that patients can regain their mobility and return to their daily activities with minimal dependence on others.⁴ The critical role of postoperative care and rehabilitation in achieving these outcomes cannot be overstated. The choice of surgical hardware—Gamma Nail or PFN—is a decision with long-term consequences on the rehabilitation process and the patient's eventual return to normalcy.⁵

The current study retrospectively analyzed 50 patients with stable extracapsular fractures of the proximal femur, divided into two groups based on the surgical intervention received.⁶ The research meticulously tracks the rehabilitation progress of these individuals, focusing on mobility scores and social dependency scales at various postoperative intervals. These measures provide a quantitative assessment of the patient's recovery, offering insights into how effectively each surgical method facilitates the return to pre-injury functional status.⁷

Furthermore, this analysis delves into the nuances of postoperative pain management, a critical component of patient care that directly influences rehabilitation efforts and outcomes. By comparing pain scores across both groups over time, the study seeks to uncover any differential impact of the surgical techniques on patient discomfort and its subsequent

management, an area of concern that significantly affects the patient's recovery experience and engagement in physical therapy.⁸

In synthesizing the findings, this paper makes a significant contribution to the orthopedic field by highlighting the importance of considering long-term functional outcomes when selecting a surgical approach for managing stable extracapsular fractures of the proximal femur. It underscores the necessity of a holistic view in surgical decision-making, one that balances the immediate goals of fracture fixation with the broader objectives of maximizing postoperative mobility, minimizing social dependency, and improving the overall quality of life for patients.⁹

By providing a detailed comparative analysis of Gamma Nail and PFN interventions, the study not only guides clinicians in their surgical choices but also emphasizes the critical role of comprehensive postoperative care and tailored rehabilitation programs. This approach ensures that surgical success is measured not just by the healing of bone but by the restoration of the individual's ability to lead an active and independent life.

Results

The study meticulously evaluated the postoperative recovery and rehabilitation outcomes of 50 patients undergoing treatment for stable extracapsular fractures of the proximal femur, comparing the use of Closed Reduction and Internal Fixation (CRIF) with Gamma Nail versus Proximal Femoral Nail (PFN).

Mobility Improvements Over Time: Both groups demonstrated significant improvements in mobility scores from the pre-operative state to various post-operative intervals. Notably, the PFN group exhibited a more pronounced enhancement in mobility, particularly by the 36th week, indicating a potentially faster recovery or more effective rehabilitation protocol associated with PFN. Initially, both groups had similar mobility limitations; however, as time progressed, patients treated with PFN achieved better mobility scores,

suggesting an advantage in facilitating quicker patient mobility post-surgery.

Social Dependency Reduction: The reduction in social dependency scores over time for both groups indicates an improvement in patients' ability to perform daily living activities independently. The PFN group showed a more significant decrease in social dependency scores, especially noticeable by the 12th week post-operation. This reduction underscores the potential of PFN to expedite the return to independence, reducing the need for assistance in daily activities at an earlier stage compared to the Gamma Nail group.

Pain Management Efficacy: Pain scale assessments revealed a decline in reported pain levels over time in both groups, with a notable distinction in the PFN group, which reported significantly less pain from the 5th post-operative day to the 6th week. This suggests that the PFN may offer advantages in pain management and patient comfort in the immediate postoperative phase. However, pain levels eventually aligned between the two groups, indicating comparable long-term pain management efficacy.

Associated Injuries and Medical Illness: The study also considered the impact of associated injuries and medical illnesses, which were comparably distributed across both groups. This uniformity ensures that the observed differences in recovery outcomes can be attributed to the type of surgical intervention rather than variations in patient health status.

Overall, the findings from this study highlight the effectiveness of both Gamma Nail and Proximal Femoral Nail in managing stable extracapsular fractures of the proximal femur, with some differences observed in recovery trajectories. The PFN group demonstrated quicker improvements in mobility and a more rapid decrease in social dependency, suggesting benefits over the Gamma Nail in terms of rehabilitation outcomes. While pain management appeared more effective with PFN in the early postoperative period, both groups achieved comparable levels of pain relief in later stages. These insights contribute valuable knowledge towards optimizing postoperative care and rehabilitation strategies to enhance patient outcomes following surgery for proximal femur fractures.

Table 1: Mobility Scores at Various Post-op Intervals

Post-Op Interval	CRIF with Gamma Nail	CRIF with PFN
Pre-op	1.38±0.824	1.24±0.523
1st POD	9±0	9±0
2nd POD	8±0	8.12±0.332
6 weeks	4.95±0.759	4.72±0.843
12 weeks	4.6±0.883	4.04±0.889
18 weeks	4±1.076	3.38±1.056
24 weeks	3.81±1.109	2.78±1.242
30 weeks	3.7±1.494	2±1.033
36 weeks	3.56±1.667	2±1.109
54 weeks	2.56±1.878	2±1.309

Table 2: Social Dependency Scores Over Time

Post-Op Interval	CRIF with Gamma Nail	CRIF with PFN
Pre-op	7.21±0.415	7.16±0.374
1st POD	8±0	8±0
14th POD	6.21±0.509	5.64±0.81
6 weeks	5.25±0.786	4.24±0.97
12 weeks	4.5±1	3.36±1.186

18 weeks	3.8±1.056	3±1.063
24 weeks	3.38±1.204	2.74±1.096
30 weeks	3±1.414	2±1.095
36 weeks	2.78±1.563	1.93±1.141
54 weeks	2.33±1.803	2±1.309

Table 3: Pain Scale Comparison at Different Post-Op Intervals

Post-Op Interval	CRIF with Gamma Nail	CRIF with PFN
Pre-op	1±0	1.08±0.4
1st POD	8±0	8±0.289
14th POD	5.29±0.464	4.88±0.726
6 weeks	4.15±0.671	3.68±0.802
12 weeks	3.4±0.598	2.88±0.781
18 weeks	2.65±0.587	2.49±0.751
24 weeks	2.5±0.632	1.96±0.825
30 weeks	2.3±0.675	1.88±0.885
36 weeks	1.78±0.833	1.36±0.842
54 weeks	1.44±0.527	1.5±1.069

Table 4: Overview of Associated Injuries and Medical Illness

Category	CRIF with Gamma Nail	CRIF with PFN
Associated Injury	4 (8.2%)	4 (8.2%)
Associated Medical Disease	24 (46.9%)	24 (46.9%)
Other Musculoskeletal Injuries	2 (4.1%)	2 (4.1%)

Discussion

The comparative analysis of postoperative recovery and rehabilitation between Gamma Nail and Proximal Femoral Nail (PFN) for treating stable extracapsular fractures of the proximal femur sheds light on the nuanced outcomes associated with each surgical method. The study's findings reveal significant improvements in patient mobility and reductions in social dependency post-surgery, with noteworthy differences in the pace and extent of recovery between the two groups.¹⁰

Mobility and Social Dependency: The quicker improvements in mobility and more pronounced reduction in social dependency observed in the PFN group may be attributed to the design and mechanical advantages of the PFN system, which could offer more stability and allow for earlier mobilization. This is a crucial factor in the rehabilitation process, as early mobilization has been associated with better overall

outcomes, including reduced hospital stay, quicker return to pre-injury activity levels, and decreased risk of postoperative complications such as deep vein thrombosis and pulmonary embolism.¹¹

Pain Management: The differential in pain management effectiveness, particularly in the early postoperative period, highlights the importance of surgical technique, implant choice, and postoperative care protocols in influencing patient comfort and recovery trajectory. Pain is a significant barrier to effective rehabilitation, and its management is crucial for encouraging patient participation in physical therapy and activities of daily living.

Associated Injuries and Medical Illness: The similar distribution of associated injuries and medical illnesses across both groups ensures that the observed differences in outcomes are likely attributable to the surgical intervention rather than pre-existing conditions. This underlines the

importance of a comprehensive preoperative assessment to identify and mitigate potential complicating factors, tailoring the surgical and rehabilitation approach to each patient's unique health profile.¹²

Clinical Implications: These results have significant clinical implications, suggesting that while both Gamma Nail and PFN are effective for treating stable extracapsular fractures of the proximal femur, PFN might offer some advantages in terms of postoperative mobility, social dependency, and pain management. However, the choice of surgical intervention should also consider patient-specific factors, including bone quality, fracture configuration, and overall health status, to optimize outcomes.

Conclusion

This study contributes valuable insights into the postoperative recovery and rehabilitation outcomes of Gamma Nail versus PFN in the management of stable extracapsular fractures of the proximal femur. The findings advocate for a personalized approach to surgical planning and rehabilitation, emphasizing the role of early mobility and effective pain management in achieving optimal recovery. Future research should explore long-term functional outcomes and patient satisfaction to further refine surgical and rehabilitation protocols.

References

1. Takakusaki K, Tomita N, Yano M. Substrates for normal gait and pathophysiology of gait disturbances with respect to the basal ganglia dysfunction. *Journal of Neurology*. 2008;255 Suppl 4:19-29.
2. Leveille SG, Jones RN, Kiely DK, Hausdorff JM, Shmerling RH, Guralnik JM, Kiel DP, Lipsitz LA, Bean JF. Chronic musculoskeletal pain and the occurrence of falls in an older population. *JAMA*. 2009;302(20):2214-2221.
3. Yang Y, Lin X. Epidemiological features of 877 cases with hip fracture. *Zhongshan Liu Xing Bing Xue Za Zhi*. 2014;35(4):446-448.
4. Karakus O, Ozdemir G, Karaca S, Cetin M, Saygi B. The relationship between the type of unstable intertrochanteric fractures femur and mobility in elderly. *Journal of Orthopaedic Surgery and Research*. 2018;13(1):207.
5. Arafa M et al. COVID-19 pandemic and hip fractures: impact and lessons learned. *Bone Joint Open*. 2020;1(9):530-540.
6. Sharma A, Seth A, Sharma S. Treatment of stable Intertrochanteric fractures of femur with proximal femoral nail vs DHS: a comparative study. *Revista Brasileira de Ortopedia*. 2018;53(4):477-481.
7. Haidukewych GJ. Intertrochanteric fractures: ten tips to improve results. *Journal of Bone Joint Surgery*. 2009;91(3).
8. Ozkan K, Eceviz E, Unay K, Tasyikan L, Akman B, Erin A. Treatment of reverse oblique trochanteric femoral fractures with proximal femoral nail. *International Orthopaedics*. 2011;35:595-598.
9. Wang F, Meng C, Cao XB, Chen Q, Xu XF, Chen Q. Hemiarthroplasty for the treatment of complicated femoral intertrochanteric fracture in elderly patients. *Zhongguo Gu Shang*. 2018;31(9):818-823.
10. Davenport RD, Vaidean GD, Jones CB, Chandler AM, Kessler LA, Mion LC. Falls following discharge after an in-hospital fall. *BMC Geriatrics*. 2009;9(1):17.
11. Benoliel JQ, McCorkle R, Young K. Development of a social dependency scale. *Research in Nursing & Health*. 1980;3(1):3-10.
12. Kouvidis K, Sommers B, Giannoudis PV, Katonah PG, Bottling M. Comparison of migration behavior between single and dual screw implants for intertrochanteric fracture fixation. *Journal of Orthopaedic Surgery and Research*. 2009;4:16.