

**CLINICAL AND RADIOGRAPHIC OUTCOMES IN THE SURVIVORSHIP OF  
UNCEMENTED FEMORAL STEMS**Dr. Ashish Meena<sup>1</sup>, Dr. Anu Kumar Changkum<sup>1</sup>, Dr. Akshay Sharma<sup>1\*</sup> and Dr. Lokesh Thakur<sup>2</sup><sup>1</sup>MS Orthopaedics, Dr. RPGMC Kangra at Tanda.<sup>2</sup>Professor, Department of Orthopaedics, Dr. RPGMC Kangra at Tanda.

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**ABSTRACT**

**Background:** The success of hip arthroplasty is heavily influenced by the choice of femoral stem, with proximally coated and fully coated uncemented stems being common options. This study compares their clinical and radiographic outcomes to guide optimal selection. **Methods:** A retrospective analysis evaluated clinical scores (Modified Harris Hip Score, Oxford Hip Score, Forgotten Joint Score) and radiographic outcomes (porous interfaces, spot welds, interface deterioration) of patients with proximally vs. fully coated uncemented femoral stems over a midterm follow-up period. **Results:** Proximally coated stems demonstrated slightly higher functional scores and a longer mean survival time (4 years) compared to fully coated stems (3.056 years). Interface deterioration was more common in the fully coated group, suggesting potential long-term stability concerns. **Conclusion:** The study suggests proximally coated uncemented femoral stems may offer superior pain management, functional recovery, and longevity. The choice between stem types should consider individual patient needs and the potential for long-term challenges. Personalized selection is crucial for optimizing outcomes in hip arthroplasty.

**KEYWORDS:** Hip arthroplasty, femoral stem, proximally coated, fully coated, uncemented, clinical outcomes, radiographic outcomes, survivorship.

**INTRODUCTION**

The selection of an appropriate femoral stem is a cornerstone in the success of hip arthroplasty, significantly influencing patient recovery, satisfaction, and the long-term survival of the prosthesis.<sup>[1]</sup> This article endeavors to compare the clinical and radiographic outcomes associated with proximally coated versus fully coated uncemented femoral stems, scrutinizing their performance through a midterm follow-up. Evaluating the efficacy of these stem types through clinical scores and radiographic findings offers a comprehensive perspective on their role in hip arthroplasty's success.<sup>[2]</sup>

Radiographic evaluations play a pivotal role in assessing the integration and stability of femoral stems over time. Indicators such as the appearance of porous interfaces, spot welds, and smooth interfaces provide critical insights into the osteointegration process and the long-term behavior of these implants within the osseous environment.<sup>[3]</sup> Coupled with clinical assessments like the Modified Harris Hip Score and the Oxford Hip Score, this multifaceted approach facilitates a deeper understanding of how proximally and fully coated stems

contribute to postoperative recovery and implant longevity.<sup>[4]</sup>

This article aims to bridge the gap between clinical outcomes and radiographic evidence, offering an in-depth analysis of the factors contributing to the success of femoral stem coatings in hip arthroplasty.<sup>[5]</sup> By detailing the comparative advantages and potential limitations of each stem type, the study provides valuable guidance for orthopedic surgeons in the selection process, aiming to enhance patient outcomes in hip replacement surgeries. The insights garnered from this investigation promise to inform future implant design innovations and refine surgical practices, ensuring that patient care in hip arthroplasty is both evidence-based and patient-centered.<sup>[6]</sup>

**MATERIALS AND METHODS****Type of Study**

This investigation was conducted as a retrospective study aimed at evaluating the survivorship of proximally coated versus fully coated uncemented femoral stems over a midterm period.

**Place of Study**

The research was carried out at the Department of Orthopedics, Dr. Rajender Prasad Govt. Medical College Kangra at Tanda, Himachal Pradesh.

**Study Duration**

The study spanned one year from the start date, during which patients underwent a one-time follow-up.

**Study Design**

A retrospective analysis was performed, comparing the survivorship of proximally coated and fully coated uncemented femoral stems. Data were extracted from a retrospectively maintained department database of total hip arthroplasties.

**Study Population**

Patients who met the inclusion criteria were considered for the study.

**Inclusion Criteria**

1. Patients who underwent uncemented total hip replacement (THR) using either proximally coated or fully coated femoral stems.
2. Patients who consented to participate in the study and were willing to undergo follow-up.

**Exclusion Criteria**

1. Patients who did not give consent for participation.
2. Cases involving hybrid, reverse hybrid, and cemented THR.

**METHODOLOGY****Ethical Clearance and Consent**

The study commenced after receiving necessary ethical clearance, and only patients who provided informed consent were enrolled.

**Data Collection**

Preoperative and perioperative data were accessed from the department's database. This included demographic details, clinical diagnoses, types of surgery, duration of surgery, types of implants used, and any perioperative complications.

**Follow-Up and Outcome Measurement**

Patients were evaluated every 3 months up to a maximum follow-up of 3 years. Assessments included clinical, radiological, and functional outcomes.

**Radiological Assessment**

Radiographs were examined for signs of implant fixation and stability according to all Gruen zones. This included analyzing the appearance of porous interfaces, spot welds, smooth interfaces, pedestals, calcar modeling, interface deterioration, migration, and particle shedding. Complications such as aseptic loosening and periprosthetic fractures were also noted.

**Functional Outcome Assessment**

Patients' functional outcomes were assessed using the Harris Hip Score, Oxford Hip Score, and Forgotten Hip Score.

**Operative Procedure and Postoperative Rehabilitation**

Details on the operative steps and postoperative rehabilitation protocols were documented, focusing on clinical and radiological evaluations to determine the effectiveness of proximally coated and fully coated femoral stems.

**Statistical Analysis**

The data were analyzed to compare the survivorship and outcomes of the two types of femoral stems, utilizing scores like the Harris Hip Score, Oxford Hip Score, and Forgotten Hip Score, alongside Engh grading for a detailed evaluation of clinical and radiographic outcomes.

**RESULTS**

The long-term clinical performance of uncemented femoral stems was assessed through the Modified Harris Hip Score, Oxford Hip Score, Forgotten Joint Score, and Kaplan Meier survival analysis. The proximally coated group demonstrated a slightly higher Modified Harris Hip Score and Oxford Hip Score, suggesting better pain management and functional recovery.

The Forgotten Joint Score, reflecting patients' ability to forget the artificial joint in everyday activities, was higher in the proximally coated group, indicating a better quality of life. Kaplan Meier survival analysis revealed a mean survival time of 4 years for proximally coated stems and 3.056 years for fully coated stems, highlighting the robustness and durability of the proximally coated femoral stems in the long term. These results provide valuable insights into the long-term effectiveness of uncemented femoral stems in total hip replacement surgeries.

**TABLE 1: CALCAR MODELLING.**

Calcar Modelling	PROXIMALLY COATED	FULLY COATED
Present	16 (100%)	18 (100%)
Absent	0 (0%)	0 (0%)

**TABLE 2: INTERFACE DETERIORATION.**

Interface Deterioration	PROXIMALLY COATED	FULLY COATED
Present	3 (18.8%)	8 (44.4%)
Absent	13 (81.3%)	10 (55.6%)

**TABLE 3: ASEPTIC LOOSENING.**

Aseptic Loosening	PROXIMALLY COATED	FULLY COATED
Present	0 (0%)	0 (0%)
Absent	16 (100%)	18 (100%)

**TABLE 4: PROXIMALLY COATED STEM SURVIVAL BY KAPLAN MEIER SURVIVAL ANALYSIS.**

Survival Time (years)	Estimate	Std. Error	95% Confidence Interval
Mean	4.000	.316	Lower: 3.380, Upper: 4.620
Median	4.000	.289	Lower: 3.434, Upper: 4.566

**TABLE 5: FULLY COATED STEM SURVIVAL BY KAPLAN MEIER SURVIVAL ANALYSIS.**

Survival Time (years)	Estimate	Std. Error	95% Confidence Interval
Mean	3.056	.221	Lower: 2.622, Upper: 3.489
Median	3.000	.144	Lower: 2.718, Upper: 3.282

## DISCUSSION

This comprehensive retrospective study provides a nuanced comparison of clinical and radiographic outcomes for proximally versus fully coated uncemented femoral stems in hip arthroplasty.<sup>[7]</sup> The findings underscore the significance of stem coating in influencing patient recovery, satisfaction, and the long-term survival of the prosthesis. Clinical outcomes, as measured by the Modified Harris Hip Score, Oxford Hip Score, and Forgotten Joint Score, alongside radiographic analyses, including the assessment of porous interfaces, spot welds, smooth interfaces, and complications such as aseptic loosening, collectively contribute to our understanding of each stem type's performance.<sup>[8]</sup>

The slightly higher scores in pain management and functional recovery observed in the proximally coated group suggest that these stems may offer advantages in terms of patient comfort and postoperative rehabilitation.<sup>[9]</sup> Furthermore, the higher Forgotten Joint Score in this group indicates a better quality of life, as patients are less likely to be reminded of their artificial joint during daily activities.<sup>[10]</sup> Kaplan Meier survival analysis further highlights the durability of proximally coated stems, with a mean survival time exceeding that of fully coated stems.<sup>[11,12]</sup>

However, the presence of interface deterioration and the formation of pedestals observed in the study raise questions about the long-term stability and osseointegration of fully coated stems. These findings may reflect inherent differences in the biological response to each stem type, potentially influenced by factors such as patient age, bone quality, and activity level.

## CONCLUSION

The study's results advocate for a personalized approach to the selection of femoral stems in hip arthroplasty, emphasizing the importance of considering individual patient characteristics and surgical goals. Proximally coated stems, with their associated higher functional scores and longer survival times, may be more suitable for patients prioritizing pain management, functional recovery, and quality of life. However, the choice of stem

type should also consider potential long-term challenges, such as interface deterioration, particularly in patients with specific clinical or anatomical considerations.

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