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A Practical Guidebook in Femoral Neck Fixation System



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Step-by-Step Guide to Surgical Procedures for Femoral Neck Fracture Fixation

Sachin Yashwant Kale, Prasad Liladhar Chaudhari, Arvind J Vatkar, Shikhar D Singh

SURGICAL APPROACHES, POSITIONING, AND INTRAOPERATIVE CONSIDERATIONS

Patients undergoing this procedure are administered suitable anesthesia and positioned in supine position on an Orthopedic traction table.

The fractured neck is meticulously realigned to restore its optimal anatomical orientation, employing the capabilities of the traction table.

If there is inability to achieve a closed reduction, open reduction is mandatory (Watson–Jones approach) as an anatomical reduction is a prerequisite for starting the procedure.

To maintain the highest standards of asepsis, the surgical field is prepared, involving the application of antiseptic solutions, scrubbing, and placement of sterile drapes.

To aid in reducing and stabilizing of the fracture, mild traction is used, which entails gradual movements in flexion, adduction, abduction, and internal rotation of roughly 15 degrees, while maintaining the neck of the femur parallel to the operating table

Reduction confirm in both AP and LAT views under C Arm **(Figs. 1A and B)**.



FIGS. 1A AND B: Reduction confirm in both anterior-posterior (AP) and lateral (LAT) views.

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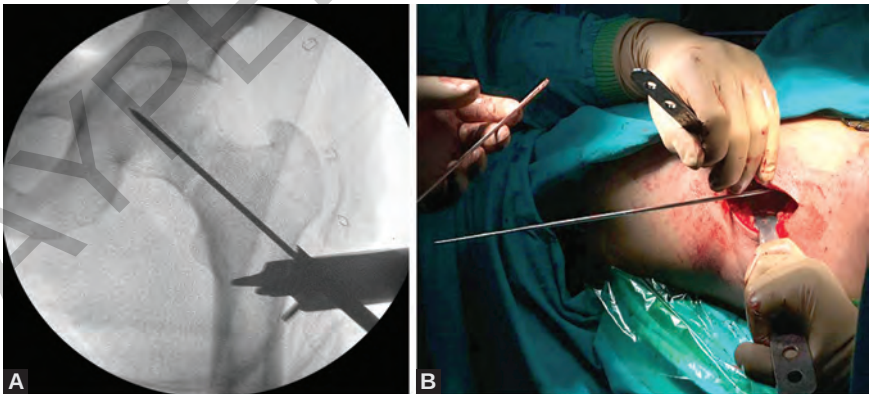
A transverse incision of about 4–5 cm is carefully made below the greater trochanter, along the shaft of femoral bone **(Fig. 2)**.

A 4–5 cm transverse incision is made from the greater trochanter along the shaft of the femur. Incision deepened to exposed the tensor fascia lata. TFL incised to expose the bone. A guidewire placed in the centre of the femoral head in both AP and lateral views with the help of an angle guide **(Figs. 3A to D)**.



FIG. 2: A transverse incision of about 4 cm is carefully made below the greater trochanter, allowing entry to the lateral compartments of the femoral bone.



FIGS. 3A TO D: *Continued*

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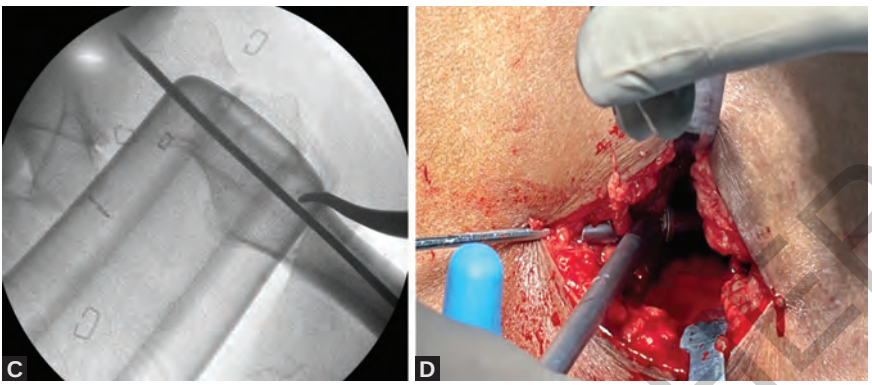
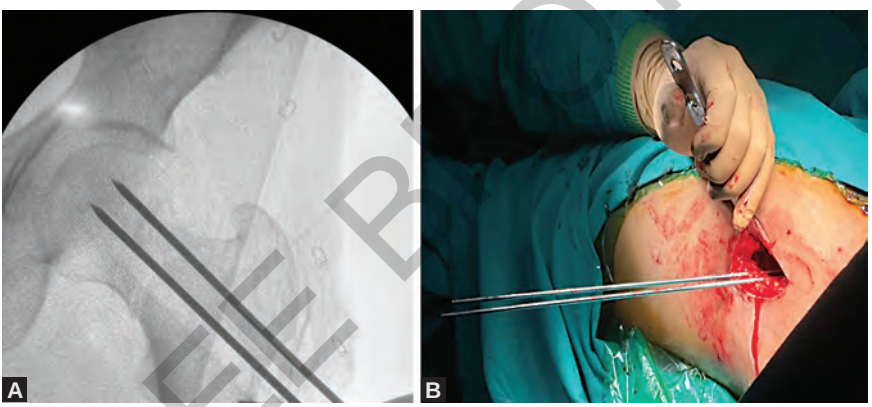


FIGS. 3A TO D: Guidewire placed in the center of the head; anterior-posterior (AP) and lateral views and clinical picture.



FIGS. 4A AND B: To prevent the femoral head from rotating unintentionally, a derotation guidewire is placed either via a lateral incision or percutaneously into the superior and anterior regions of the femoral neck.

To prevent the femoral head from rotating unintentionally, a derotation guide wire is placed either via a lateral incision or percutaneously into the superior and anterior region of the femoral neck under C-arm guidance **(Figs. 4A and B)**.

Reaming done under C-arm guidance to ensure there is no displacement at the fracture site **(Figs. 5A to C)**.

Precise measurements are taken to determine the required length and select the appropriate femoral neck system implant, aided by a direct measuring instrument. The implant is then carefully introduced into the pre-reamed hole over the central guidewire **(Figs. 6A and B)**.

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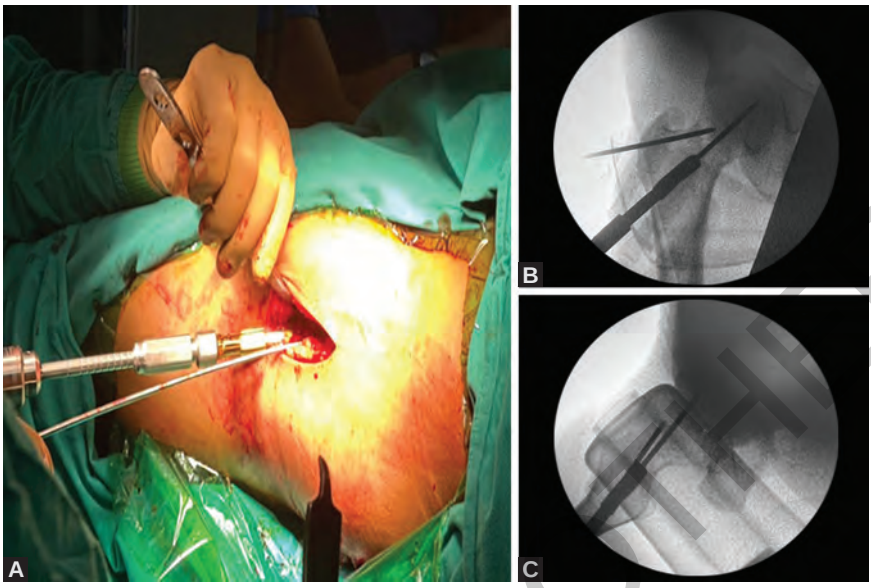
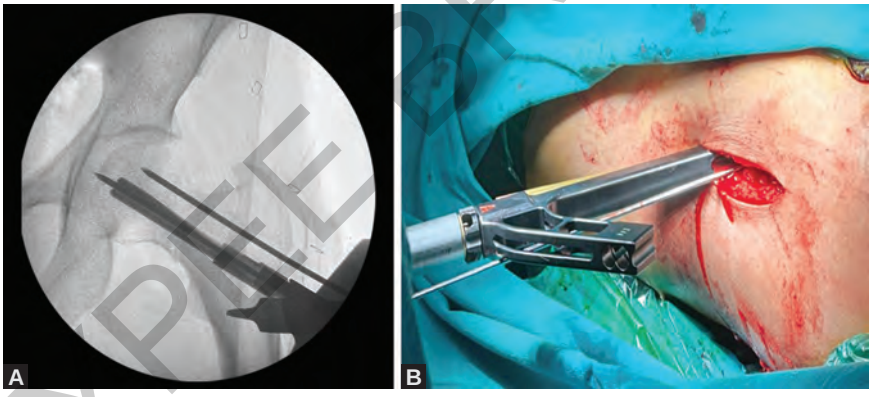


FIGS. 5A TO C: Reaming done.



FIGS. 6A AND B: Precise measurements are taken to determine the required length and select the appropriate femoral neck system, aided by a direct measuring instrument. The implant is then carefully introduced into the pre-reamed hole over the central guidewire.

Top screw inserted and shaft screw drilling done and after proper measurement shaft screw pass **(Figs. 7A to C)**.

Shaft screw placed and derotation screw passed to complete the procedure **(Figs. 8A and B)**.

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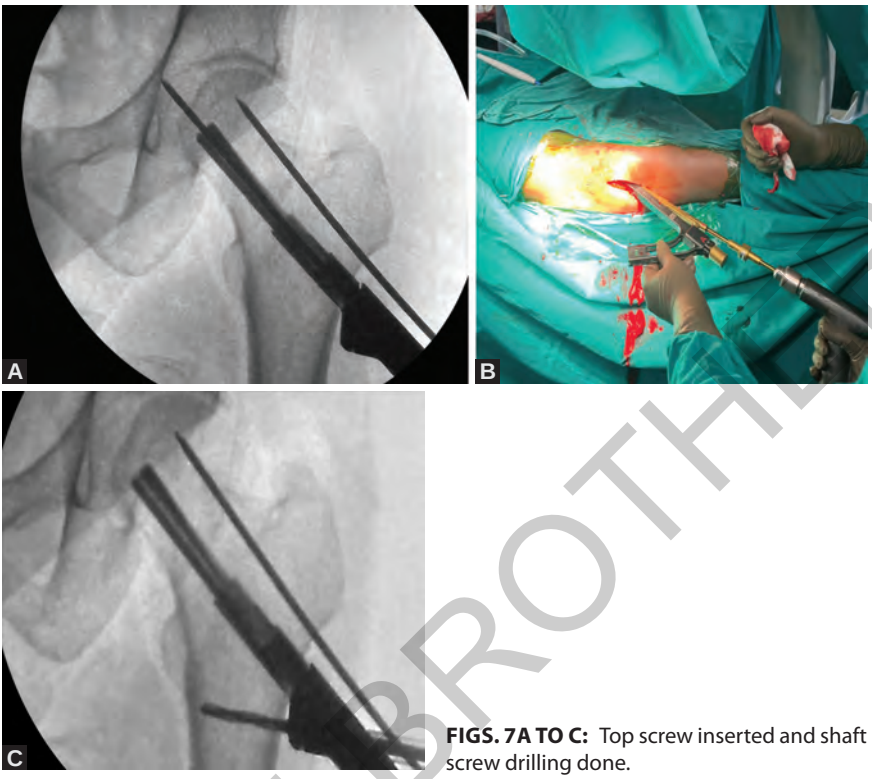
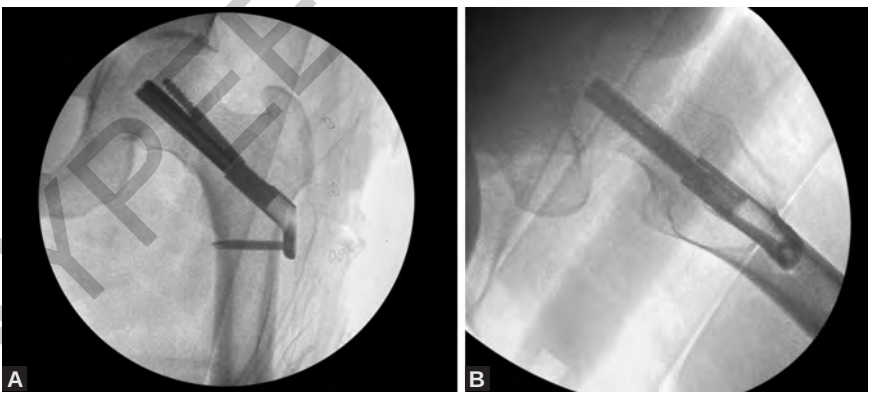


FIGS. 7A TO C: Top screw inserted and shaft screw drilling done.



FIGS. 8A AND B: Shaft screw placed and derotation screw passed to complete the procedure.

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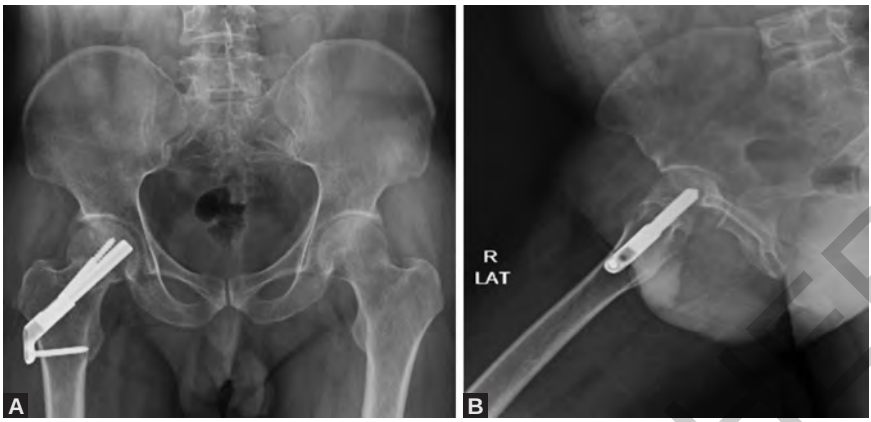

FIGS. 9A AND B: Postoperative X-rays.

Final post operative X-rays showing good reduction and proper placement of implant **(Figs. 9A and B)**.

Summary

The step-by-step guide to femoral neck fracture fixation involves positioning the patient supine on a fracture table with spinal anesthesia. If closed reduction is unsuccessful, an open reduction via the Watson–Jones approach is performed. A 4 cm transverse incision below the greater trochanter allows access for guidewire placement and reaming. The fracture is realigned and the appropriate implant is introduced. Precise measurements ensure proper implant selection, with subsequent insertion of the top screw, shaft screw, and derotation screw, followed by postoperative X-rays to confirm reduction.

SUGGESTED READINGS

1. Zhang C. Hip Surgery: A Practical Guide. Singapore: Springer Nature; 2020.
2. Kale S, Mishra R, Singh S, Chalak A, Vatkar A, Ghodke R, et al. A prospective study to analyze the functional outcome of the femoral neck system in femoral neck fractures. MGM J Med Sci. 2023;10(3):409-14.

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Salient Features

- Expert contributions authored by a team of highly experienced trauma surgeons and orthopedic specialists, offering deep insights into femoral neck fracture management
- *Comprehensive coverage:* Detailed examination of femoral neck fractures, including definitions, classifications, epidemiology, and incidence rates
- *Historical and modern perspectives:* Thorough historical overview and evolution of modern femoral neck system implants, with comparative analysis of various fixation methods
- *Design and components of implants:* In-depth description of the design principles and key components of femoral neck system implants, including screws, plates, and locking mechanisms
- *Practical surgical guide:* Step-by-step surgical procedures for femoral neck fracture fixation, with positioning, intraoperative considerations, and tips for optimal implant placement
- *Postoperative care and rehabilitation:* Guidelines for immediate postoperative management and rehabilitation protocols, emphasizing early mobilization and functional recovery
- *Complications and management:* Comprehensive overview of common complications, identification, prevention, and management strategies, including salvage procedures
- *Clinical outcomes and studies:* Review of clinical outcomes and functional results, with summaries of key findings from relevant clinical studies and meta-analysis
- *Future perspectives and innovations:* Exploration of emerging trends and advancements in femoral neck system implants, with predictions for future research and technology directions
- *Practical orientation:* User-friendly layout with tables, figures, and flowcharts, offering practical tips and step-by-step procedures for everyday clinical practice
- *Summary and key takeaways:* Recap of important points, final thoughts on the significance of femoral neck system implants, and a call to action for ongoing education and collaboration in improving patient outcomes
- This book is an invaluable resource for trauma surgeons, orthopedic specialists, and healthcare professionals involved in the management of femoral neck fractures, providing both comprehensive academic knowledge and practical guidance

Sachin Yashwant Kale is a distinguished orthopedic surgeon based in Navi Mumbai, currently serves as Professor and Head of Unit at DY Patil Medical College and Hospital in Nerul, Navi Mumbai, Maharashtra, since February 2017. His extensive professional experience also includes positions such as Associate Professor and Lecturer at the same institution since 2004, and Registrar at TNMC Nair Hospital, Mumbai, Maharashtra. He is an MS in Orthopedics from TNMC Nair Hospital and holds a Diploma in Orthopedics. He is a Consultant Orthopedic Surgeon affiliated with several hospitals including Apollo Hospital, Fortis Hospital, and Medicity Hospital in Navi Mumbai. As an active member of the orthopedic community, he holds prominent roles such as President of the Navi Mumbai Orthopedic Association and Executive Council Member of the Bombay Orthopaedic Society. Dr Kale has made significant contributions to medical research and education, serving as Editor-in-Charge of the Journal of Medical Thesis, Associate Editor of the Journal of Orthopedic Case Reports, and Editor for the Journal of Clinical Orthopaedics. His specialized training includes joint arthroplasty fellowships and trauma management courses. He is recognized for his research and publications, with more than 100 papers in esteemed journals, reflecting his dedication to advancing orthopedic science and practice. His published works cover a wide range of topics, including robotic total knee replacements, thyroid levels in women with lower back pain, and innovative techniques in fracture fixation, among others. Dr Kale's achievements also include a Guinness World Record for Most Authors on a Single Peer-Reviewed Academic Paper, underlining his collaborative and impactful contributions to the medical field.

Arvind J Vatkar is a distinguished orthopedic spine surgeon and Assistant Professor at MGM Medical College, Nerul, Navi Mumbai, Maharashtra, has made significant contributions to the field of orthopedics through his keen interest in learning and publications. Born on December 12, 1984, he has demonstrated a strong academic foundation and professional excellence throughout his career. Dr Vatkar earned his MBBS from Lokmanya Tilak Municipal Medical College, Sion, Mumbai, Maharashtra, and furthered his expertise with an MS in Orthopedics from Lady Hardinge Medical College, New Delhi. His commitment to academic and clinical excellence is evident from his numerous roles, including serving as a Senior Spinal Fellow at Queen's Medical Centre, Nottingham University Hospitals, where he was awarded with Advanced Spine Surgery Fellowship from Royal College of Surgeons, and an International Training Fellow (MCh Spine) at Stepping Hill Hospital, Stockport, UK. A prolific researcher, Dr Vatkar has published approximately 41 articles in both national and international journals. His work is highly regarded in the medical community, particularly his publications on femoral neck fixation systems and their complications. One notable study, published on PubMed, explores the limitations and complications in treating femoral neck fractures with the femoral neck system, highlighting his expertise in this area. Dr Vatkar's research interests are diverse, encompassing innovative surgical techniques, fracture management, and advancements in orthopedics and spine surgery. His dedication to advancing medical knowledge is reflected in his active participation in international conferences and contributions to significant clinical studies. With his extensive clinical experience and a robust portfolio of publications, he is exceptionally well qualified to contribute to "A Practical Guidebook in Femoral Neck Fixation System", offering invaluable insights and practical guidance to practitioners and students alike.

Vishal Kumar is presently working as Professor (Additional) in the Department of Orthopedics at PGIMER, Chandigarh, India, an institute of national importance and international repute. He has authored about 300 peer-reviewed publications, edited 7 textbooks and reference books on orthopedics, and written 25 book chapters. He is an investigator of several intramural and extramural research projects. He has innovated and published eight patents and surgical approaches. He is a reviewer of several esteemed journals and has won several international and national awards—all this presents him as an exceptional academician of extraordinary brilliance.

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