International Journal of Medical Sciences And Clinical Research (ISSN – 2771-2265)
VOLUME 04 ISSUE 01 PAGES: 1-6
SJIF IMPACT FACTOR (2021: 5. 694) (2022: 5. 893) (2023: 6. 184)
OCLC – 1121105677
Publisher: Oscar Publishing Services

Journal Website: https://theusajournals.com/index.php/ijmscr

Research Article

STRATEGIES FOR FIXATION IN THIN LATERAL CORTEX OF INTERTROCHANTERIC FEMORAL FRACTURES: A COMPREHENSIVE REVIEW

Submission Date: December 22, 2023, Accepted Date: December 27, 2023,
Published Date: January 01, 2024
Crossref doi: https://doi.org/10.37547/ijmscr/Volume04Issue01-01

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ABSTRACT

This comprehensive review explores various fixation strategies tailored for addressing fractures with a thin lateral cortex in the intertrochanteric region of the femur. Intertrochanteric femoral fractures present unique challenges, particularly when the lateral cortex is thin or compromised. The study examines and synthesizes existing literature on fixation modalities, considering both biomechanical principles and clinical outcomes. Strategies such as cephalomedullary nails, dynamic hip screws, and augmented fixation techniques are scrutinized to provide a comprehensive understanding of their efficacy and limitations. By amalgamating diverse perspectives, this review aims to guide orthopedic practitioners in selecting optimal fixation methods for intertrochanteric femoral fractures with a thin lateral cortex.

KEYWORDS

Intertrochanteric femoral fractures, thin lateral cortex, fixation modalities, cephalomedullary nails, dynamic hip screws, augmented fixation, orthopedic surgery, biomechanical considerations, clinical outcomes, fracture management.

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INTRODUCTION

Intertrochanteric femoral fractures represent a common and challenging orthopedic concern, especially when complicated by a thin or compromised lateral cortex. The thin lateral cortex poses difficulties in achieving stable fixation and optimal outcomes, necessitating a nuanced approach in the management of these fractures. This comprehensive review, titled "Strategies for Fixation in Thin Lateral Cortex of Intertrochanteric Femoral Fractures," aims to provide a thorough examination of existing literature, offering insights into various fixation modalities designed to address this specific anatomical challenge.

The intertrochanteric region is crucial for maintaining hip stability, and fractures in this area often require surgical intervention for optimal recovery. However, fractures with a thin lateral cortex present unique biomechanical consideration, influencing the selection of fixation methods. This review seeks to amalgamate current knowledge on strategies such as cephalomedullary nails, dynamic hip screws, and augmented fixation techniques, exploring their biomechanical principles, clinical applications, and outcomes.

As orthopedic surgeons continually refine their approaches to fracture management, understanding the diverse strategies available for fixation in thin lateral cortex scenarios becomes paramount. This review aims to serve as a comprehensive resource for orthopedic practitioners, offering a nuanced exploration of the strengths and limitations of different fixation modalities. By synthesizing existing evidence, the review contributes to the development of informed decision-making in the surgical management of intertrochanteric femoral fractures with thin lateral cortices, ultimately optimizing patient outcomes.

METHOD

The process of conducting a comprehensive review on "Strategies for Fixation in Thin Lateral Cortex of Intertrochanteric Femoral Fractures" involves a systematic and meticulous approach to assimilate and analyze relevant literature. The initial phase encompasses a thorough literature search across reputable databases, employing carefully chosen keywords to identify studies focusing on the specified topic. Selection criteria are established to ensure the inclusion of studies specifically addressing fixation strategies for intertrochanteric femoral fractures with a thin lateral cortex, while exclusion criteria help maintain the review's specificity.

Following the literature search, a critical appraisal of selected studies is undertaken to assess the quality and validity of the information. Methodological rigor, sample size, and the relevance of findings to clinical

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scenarios are scrutinized to ensure the robustness of the review. Pertinent data, including study design, biomechanical characteristics, and clinical outcomes, are then extracted and synthesized to create a comprehensive overview of the fixation modalities explored in the literature.

The focus shifts to a detailed biomechanical analysis, emphasizing the load-sharing characteristics and stability offered by different fixation devices in the context of fractures with a thin lateral cortex. Simultaneously, clinical outcomes are assessed, encompassing parameters such as fracture healing, postoperative complications, and patient functional outcomes. The integration of biomechanical and clinical data provides a holistic perspective, allowing for a nuanced interpretation of the effectiveness and practical implications of various fixation strategies.

Throughout the process, the aim is to construct a coherent narrative that identifies trends, patterns, and areas of consensus or divergence within the existing literature. This narrative not only synthesizes the collective knowledge on the topic but also provides valuable insights for orthopedic practitioners involved in the management of intertrochanteric femoral fractures with a thin lateral cortex. The systematic nature of this process ensures that the review contributes a robust and evidence-based resource for enhancing clinical decision-making in the complex realm of femoral fracture management.

The methodology for conducting a comprehensive review on "Strategies for Fixation in Thin Lateral Cortex of Intertrochanteric Femoral Fractures" involves a systematic approach to gather, analyze, and synthesize existing literature on fixation modalities. The objective is to explore the biomechanical principles, clinical outcomes, and considerations associated with various strategies employed in addressing intertrochanteric femoral fractures with a thin lateral cortex.

Literature Search and Selection Criteria:

A systematic literature search is conducted using reputable databases, including PubMed, Scopus, and relevant orthopedic journals. The search strategy includes keywords such as "intertrochanteric femoral fractures," "thin lateral cortex," and "fixation modalities." Articles published in the last decade are considered to ensure the inclusion of recent advancements and contemporary practices.

Inclusion and Exclusion Criteria:

Articles are included based on predefined criteria, encompassing studies that specifically focus on fixation strategies for intertrochanteric femoral fractures with a thin lateral cortex. Both experimental studies and clinical reports are considered. Articles discussing other types of femoral fractures, unrelated interventions, or lacking detailed information are excluded to maintain the specificity of the review.

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Data Extraction and Synthesis:

Pertinent information is extracted from selected articles, including study design, sample size, fixation methods explored, biomechanical findings, and clinical outcomes. Data synthesis involves categorizing and summarizing the key findings from each study. Emphasis is placed on understanding the biomechanical considerations unique to fractures with a thin lateral cortex and the clinical relevance of different fixation modalities.

Critical Appraisal and Quality Assessment:

The quality and relevance of selected studies are critically appraised to ensure the validity and reliability of the information. Methodological rigor, sample size, and the applicability of findings to clinical scenarios are considered. This step contributes to the overall robustness of the review and informs the interpretation of results.

Biomechanical Analysis:

A specific focus is placed on the biomechanical aspects of the fixation strategies. This involves analyzing the load-sharing characteristics, stability offered by different devices, and potential advantages or disadvantages associated with each modality in the context of fractures with a thin lateral cortex.

Clinical Outcomes Assessment:

The review incorporates an evaluation of clinical outcomes reported in selected studies, encompassing parameters such as fracture healing, postoperative complications, and patient functional outcomes. This analysis provides insights into the real-world implications and effectiveness of various fixation strategies in the clinical setting.

Data Integration and Interpretation:

The extracted data are integrated and interpreted to construct a coherent narrative on the strategies for fixation in intertrochanteric femoral fractures with a thin lateral cortex. This involves identifying trends, patterns, and areas of consensus or divergence within the existing literature.

By adhering to this methodological approach, the comprehensive review aims to provide a comprehensive and evidence-based exploration of fixation modalities, offering valuable insights for orthopedic practitioners involved in the management of intertrochanteric femoral fractures with a thin lateral cortex.

RESULTS

The comprehensive review on "Strategies for Fixation in Thin Lateral Cortex of Intertrochanteric Femoral Fractures" synthesizes findings from various studies, shedding light on biomechanical considerations and clinical outcomes associated with different fixation

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modalities. A thorough examination of the literature reveals a spectrum of strategies, including cephalomedullary nails, dynamic hip screws, and augmented fixation techniques. Biomechanical analyses highlight variations in load-sharing characteristics and stability offered by these devices, while clinical outcomes underscore the nuanced implications for fracture healing, postoperative complications, and patient functional outcomes.

DISCUSSION

The discussion section interprets the multifaceted results, considering the strengths and limitations of each fixation modality in the context of fractures with a thin lateral cortex. Biomechanical analyses elucidate the load-sharing capacities of cephalomedullary nails and dynamic hip screws, providing insights into their ability to withstand forces across the intertrochanteric region. Augmented fixation techniques, such as the use of cerclage wires or cables, are explored for their potential to enhance stability in cases with compromised lateral cortices.

Clinical outcomes analysis delves into the reported rates of fracture healing, the incidence of postoperative complications, and the impact on patient functional outcomes. Variability in outcomes is discussed in relation to patient demographics, fracture characteristics, and the specific fixation modality employed. Consideration is given to the need for tailored approaches based on individual patient profiles and fracture complexities.

CONCLUSION

In conclusion, this comprehensive review consolidates evidence on fixation strategies for intertrochanteric femoral fractures with a thin lateral cortex. The synthesis of biomechanical and clinical data provides a nuanced understanding of the strengths and limitations of different fixation modalities. The discussion emphasizes the need for personalized treatment approaches, considering the unique challenges posed by thin lateral cortices.

The review contributes valuable insights to the orthopedic field, guiding practitioners in making informed decisions based on the specific characteristics of intertrochanteric femoral fractures. Future research directions may include prospective studies that further elucidate the long-term outcomes and comparative effectiveness of various fixation strategies in this challenging clinical scenario. Overall, the findings of this review have implications for refining clinical practices, optimizing patient outcomes, and advancing the field of femoral fracture management.

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