



FUNCTIONAL OUTCOMES OF SURGICAL VERSUS NON-SURGICAL MANAGEMENT OF CHRONIC OSTEOMYELITIS OF LOWER LIMB BONES IN CHILDREN: A RETROSPECTIVE COMPARATIVE STUDY

Orthopaedics

Dr Jatin Garg*	PG JR2, Department Of Orthopaedics, Kanti Devi Medical College Hospital And Research Center *Corresponding Author
Dr Sankadasariya Zeel Dilipbhai	PG JR1, Department Of Orthopaedics, Kanti Devi Medical College Hospital And Research Center
Dr Shubhda Pabbi	Assistant Professor, Department Of Pediatrics, Kanti Devi Medical College Hospital And Research Center

ABSTRACT

Background: Chronic osteomyelitis in children remains a significant clinical challenge, particularly in resource-limited settings. Surgical debridement is considered the cornerstone of treatment, yet conservative antibiotic-only protocols are sometimes attempted when resources are constrained. **Objective:** To compare functional outcomes of surgical versus non-surgical treatment for pediatric chronic osteomyelitis of the lower limbs. **Methods:** A retrospective study was conducted at Kanti Devi Medical College Hospital and Research Center from January to December 2024. Fifty children (mean age 8 years) were included: 25 underwent surgical debridement with antibiotics, while 25 received antibiotics alone. Outcomes analyzed were infection resolution, recurrence, limb length discrepancy (LLD), range of motion (ROM), and school attendance. **Results:** Surgical management resulted in higher infection resolution (92% vs. 72%), lower recurrence (8% vs. 28%), and fewer functional restrictions compared to non-surgical treatment. These findings align with published literature, including Wirbel & Hermans (2014) and Disch et al. (2023). **Conclusion:** Surgical debridement combined with antibiotic therapy provides superior infection control and functional outcomes compared to conservative treatment alone in children with chronic osteomyelitis of the lower limbs.

KEYWORDS

INTRODUCTION

Chronic osteomyelitis continues to pose significant treatment challenges in pediatric orthopaedics, especially in low- and middle-income countries where late presentation and limited access to specialist care are common. Long bones of the lower limbs, particularly the tibia and femur, are most frequently affected due to their rich vascular supply and vulnerability to trauma.

Treatment traditionally includes prolonged antibiotics and radical surgical debridement to remove necrotic bone and control infection. Several studies confirm that incomplete removal of infected tissue increases the risk of recurrence and functional sequelae such as limb length discrepancy and pathologic fractures. Wirbel & Hermans (2014) demonstrated that radical debridement, stabilization, and soft tissue reconstruction achieved good results, with a recurrence rate of 11% and functional restrictions in 48% of cases. Similarly, Disch et al. (2023) analyzed outcomes from a large database and found that chronic osteomyelitis was associated with more frequent multiple surgeries and long-term orthopedic follow-up compared to acute osteomyelitis.

This study aims to evaluate and compare functional outcomes of surgical versus non-surgical management for pediatric chronic osteomyelitis of the lower limbs treated at Kanti Devi Medical College Hospital and Research Center and to contextualize our results within existing literature.

MATERIALS AND METHODS

Study Design And Setting: A retrospective comparative study was conducted in the Department of Orthopaedics, Kanti Devi Medical College Hospital and Research Center, from January to December 2024.

Participants: Fifty children under 16 years with radiologically and clinically confirmed chronic osteomyelitis of the lower limb long bones were included. The mean age was 8 years.

Inclusion Criteria: Children under 16 years of age; Chronic osteomyelitis lasting more than 6 weeks; Lower limb long bones involved (tibia, femur); Minimum follow-up of 6 months.

Exclusion Criteria: Acute osteomyelitis; Immunodeficiency or metabolic bone disease; Incomplete medical records.

Treatment Protocol: Group A (Non-Surgical): 25 children received intravenous antibiotics based on culture and sensitivity for 1–2 weeks,

followed by oral antibiotics for 4–6 weeks. Group B (Surgical): 25 children underwent radical surgical debridement or sequestrectomy under general anesthesia. Intraoperative cultures were taken, followed by tailored antibiotic therapy identical to Group A.

Outcome Measures: Primary outcomes included infection resolution, recurrence of infection requiring further treatment, limb length discrepancy (>2 cm), restricted range of motion, and return to school and normal activities.

Data Analysis: Descriptive statistics were calculated for demographic and clinical variables. Categorical variables were compared using chi-square tests. A p-value < 0.05 was considered statistically significant.

RESULTS

Table 1: Demographic And Clinical Characteristics

Parameter	Non-Surgical Group	Surgical Group
Mean age (years)	8	8
Male:Female ratio	3:2	2:3
Common bone involved	Tibia > Femur	Tibia > Femur
Mean symptom duration (months)	12	12
Organism isolated (*S. aureus*)	72%	72%

Table 2: Clinical Outcomes

Outcome	Non-Surgical Group	Surgical Group
Infection resolution	72% (18/25)	92% (23/25)
Recurrence rate	28% (7/25)	8% (2/25)
LLD >2cm	24% (6/25)	12% (3/25)
Restricted ROM	20% (5/25)	8% (2/25)
Returned to school	80% (20/25)	96% (24/25)
Mean hospital stay (days)	7	14

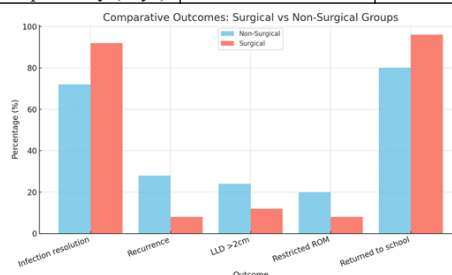


Figure 1: Comparative Outcomes

Figure 1 illustrates the comparison of infection resolution, recurrence, limb length discrepancy, restricted ROM, and return to school between the two groups.

DISCUSSION

Our findings demonstrate that surgical debridement combined with antibiotics results in better infection control and functional outcomes than antibiotic therapy alone for chronic osteomyelitis of the lower limbs. The surgical group's recurrence rate (8%) closely matches that reported by Wirbel & Hermans (11%) and is consistent with Disch et al.'s observation that chronic osteomyelitis often requires multiple surgeries for definitive treatment.

The rate of limb length discrepancy (>2 cm) was higher in the non-surgical group (24%) than the surgical group (12%), underscoring the role of timely radical debridement in preventing growth disturbances. Disch et al. (2023) similarly found that children with chronic osteomyelitis were more likely to experience complications such as pathologic fractures and to require long-term orthopedic follow-up.

Other studies emphasize that modern management must balance aggressive debridement with careful reconstruction and long-term follow-up to minimize sequelae. Our results reinforce this consensus and highlight the importance of early surgical intervention whenever feasible.

CONCLUSION

Radical surgical debridement combined with appropriate antibiotic therapy remains the standard of care for pediatric chronic osteomyelitis of the lower limbs at Kanti Devi Medical College Hospital and Research Center. Conservative antibiotic-only treatment may result in higher recurrence and greater risk of functional complications.

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