

# ORTHOPAEDICS



FOR PRIMARY  
HEALTH CARE



# LION

LEARNING INNOVATION VIA  
ORTHOPAEDIC NETWORKS

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# Bone and joint infection basics

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## Learning objectives

1. Know the pathophysiology and differences between children and adults.
2. Know the risk factors.
3. Understand the most common pathogens and know how to approach antibiotic treatment.

## Introduction

Bone and joint infections can be **acute** or **chronic**. Acute infections should be treated as orthopaedic emergency. Especially for children and immunocompromised patients infections, acute infections can lead to severe systemic illness and can have detrimental long term morbidity if not treated urgently. **Osteomyelitis** (infection of bone) can be divided into acute, sub-acute and chronic. In sub-acute osteomyelitis, infection lasts from one to several months, after which chronicity begins. Chronic osteomyelitis is characterised by progressive bone destruction and new bone apposition.

## Pathophysiology

### Hematogenous

Compared to children, adult osteomyelitis is rarely hematogenous, i.e. originated or transported by blood. When it occurs, it usually affects the spine. It is caused by microorganisms that seed the bone in the event of bacteremia. The most common organism found in hematogenous spread is *Staphylococcus aureus*. Hematogenous infections are most common in children. The metaphysis is the most common site because it is rich in blood supply (although this has sluggish flow) and is an actively

growing part of bone. It also has relatively fewer phagocytes than the physis or diaphysis.

### Contiguous spread

This mode of contamination can be associated with previous surgery, an old non healing wound (diabetic foot, neuropathic ulcer) or a previous trauma. Infection spread by contiguity from adjacent tissue to bone.

### Direct inoculation

Open fractures, penetrating injuries or bone surgeries can be a direct source of infection, resulting in osteomyelitis.

## Risk factors

- Recent trauma or surgery
- Immunocompromised patients
- IV drug use
- Poor vascular supply
- Systemic conditions such as diabetes and sickle cell anaemia
- Peripheral neuropathy

## Classification

Osteomyelitis may be classified based on the duration of illness (acute versus chronic) and the mechanism of infection (haematogenous versus non-haematogenous).

which accounts for 80–90% of positive cultures. The table below shows common organisms of different age groups and patient populations with antibiotic choice, but this should be guided by local authorities.

## Bacteriology and antibiotics

The most common infecting organism is staphylococcus aureus in all age groups,

Patient cohort and bacteriology		Antibiotics
Neonates	S. aureus (MRSA), Group B strep Gram negatives	Cloxacillin (Fusidic Acid) 3rd gen cephalosporin
6 months– 4 years	S. aureus, K. kingae, H. influenzae (rare)	Cloxacillin + Ampicillin/3rd gen cephalosporin
>4 years	S. aureus	Cloxacillin
Adults (acute)	S. aureus	
Penicillin allergy		Clindamycin
immunocompromised	S. aureus, S. pneumoniae, pseudomonas, fungal	Cloxacillin + 3rd gen cephalosporin Cloxacillin + 3rd gen cephalosporin Cefazolin is an alternative to Cloxacillin (if not available)
Sickle cell disease	S. aureus, Salmonella	
contiguous chronic osteomyelitis	The most common causative organisms are: Enterobacteriaceae sp. Staphylococcus sp. Pseudomonas aeruginosa Enterococcus sp. In 45% of infections multiple organisms cultured	Common organisms of different age groups and patient populations with antibiotic choice
haematogenous chronic osteomyelitis	Staphylococcus aureus is the most common organism involved in adults (60-90%)	

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## ABOUT THE BOOK

Informed by experts: Most patients with orthopaedic pathology in low to middle-income countries are treated by non-specialists. This book was based on a modified Delphi consensus study\* with experts from Africa, Europe, and North America to provide guidance to these health care workers. Knowledge topics, skills, and cases concerning orthopaedic trauma and infection were prioritised. Acute primary care for fractures and dislocations ranked high.

Furthermore, the diagnosis and the treatment of conditions not requiring specialist referral were prioritised.

\* Held et al. Topics, Skills, and Cases for an Undergraduate Musculoskeletal Curriculum in Southern Africa: A Consensus from Local and International Experts. JBJS. 2020 Feb 5;102(3):e10.

## THE LION

The Learning Innovation via Orthopaedic Network (LION) aims to improve learning and teaching in orthopaedics in Southern Africa and around the world. These authors have contributed the individual chapters and are mostly orthopaedic surgeons and trainees in Southern Africa who have experience with local orthopaedic pathology and treatment modalities but also in medical education of undergraduate students and primary care physicians. To centre this book around our students, iterative rounds of revising and updating the individual chapters are ongoing, to eliminate expert blind spots and create transformation of knowledge.

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