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Case Report

Bilateral severe foot osteomyelitis with polymicrobial infection: A case report

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SCHLÜSSELWÖRTER:
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Osteomyelitis;
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Zusammenfassung

Hintergrund: Eine bilaterale schwere Osteomyelitis bei nicht-diabetischen Patienten stellt eine komplexe klinische Präsentation mit hohem Amputationsrisiko dar.
Falldarstellung: Wir berichten über einen 60-jährigen nicht-diabetischen kaukasischen Mann mit arterieller Hypertonie und Faktor-V-Leiden-Mutation, der eine bilaterale schwere Osteomyelitis entwickelte. Der Patient stellte sich mit seit vier Monaten progredienten Fußulzera, Fieber und eingeschränkter Gehfähigkeit vor. Die körperliche Untersuchung ergab massive bilaterale Ödeme der unteren Extremitäten mit multiplen Ulzerationen an allen Zehen. Die Laboruntersuchungen zeigten ein erhöhtes C-reaktives Protein (119,5 mg/L) bei normalem HbA1c. Die bildgebenden Verfahren zeigten ausgedehnte osteolytische Veränderungen mit vollständiger Destruktion mehrerer Phalangen beidseitig. Der multidisziplinäre Ansatz umfasste ein zweizeitiges chirurgisches Débridement mit Einlage Antibiotika-beladener PMMA-Ketten, eine gezielte antimikrobielle Therapie gegen die polymikrobielle Infektion (MSSA, C. striatum) sowie eine adjuvante hyperbare Sauerstofftherapie. Bei der Ein-Jahres-Nachuntersuchung wurde eine vollständige Abheilung mit funktioneller Wiederherstellung erreicht, die eine Rückkehr zu normalen Aktivitäten einschließlich der Berufsausübung als Orchesterdirigent ermöglichte.
Schlussfolgerung: Dieser Fall zeigt, dass ein aggressives multidisziplinäres Management auch bei schwerer bilateraler Osteomyelitis mit ausgedehnter Knochenzerstörung bei nicht-diabetischen Patienten eine erfolgreiche Extremitätenerhaltung erreichen kann und unterstreicht die Bedeutung frühzeitiger Intervention und koordinierter Versorgung.

Abstract

Background: Bilateral severe osteomyelitis in non-diabetic patients represents a complex clinical presentation with high amputation risk.

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Limb salvage;
Antibiotic-loaded beads;
Hyperbaric oxygen therapy

Case presentation: We report a 60-year-old non-diabetic Caucasian male with arterial hypertension and factor V Leiden mutation who developed bilateral severe osteomyelitis. The patient presented with four months of progressive foot ulcers, fever, and limited ambulation. Physical examination revealed massive bilateral lower extremity edema with multiple ulcerations affecting all digits. Laboratory studies showed elevated C-reactive protein (119,5 mg/L) with normal HbA1c. Imaging demonstrated extensive osteolytic changes with complete destruction of multiple phalanges bilaterally. A multidisciplinary approach included two-stage surgical debridement with antibiotic-loaded bead placement, targeted antimicrobial therapy against polymicrobial infection (MSSA, C. striatum), and adjunctive hyperbaric oxygen therapy. Complete healing with functional restoration was achieved at one-year follow-up, allowing return to normal activities including professional work as an orchestra conductor.
Conclusion: This case demonstrates that aggressive multidisciplinary management can achieve successful limb salvage even in severe bilateral osteomyelitis with extensive bone destruction in non-diabetic patients, emphasizing the importance of early intervention and coordinated care.

Introduction

Osteomyelitis manifests as either an acute or chronic infectious disease that develops through hematogenous dissemination or direct bacterial inoculation [1,2]. This complex infectious condition is characterized by progressive inflammatory destruction and new bone formation [3]. While typically associated with risk factors such as diabetes mellitus, peripheral vascular disease, or trauma, atraumatic osteomyelitis in non-diabetic patients presents unique characteristics [4]. The infection can be caused by low-pathogenic microorganisms with sparse clinical symptoms, making early diagnosis difficult [5]. Polymicrobial infections further complicate the clinical picture, often requiring aggressive treatment. In severe cases, particularly those involving the foot and ankle, amputation rates can reach 10—40% when conservative management fails, significantly impacting patient quality of life and functional outcomes [6].

We present a rare and complex case of bilateral severe osteomyelitis in a 60-year-old non-diabetic patient with massive plantar ulcerations affecting multiple toes. This case is particularly significant due to its polymicrobial nature, the extensive bilateral involvement, the particular adopted surgical framework and the successful limb-salvage outcome achieved through an aggressive multidisciplinary approach. The patient underwent repeated surgical debridement with antibiotic-loaded beads, combined with targeted antimicrobial therapy and hyperbaric oxygen treatment. Despite the severity of bone destruction and the high risk of amputation, this comprehensive strategy resulted in complete healing and functional restoration, demonstrating that limb preservation is achievable even in complex cases of osteomyelitis when early diagnosis and coordinated multidisciplinary care are implemented.

Case presentation

We present the case of a 60-year-old, orchestra conductor, Caucasian male with a medical history of arterial hypertension, class II obesity, heterozygous factor V Leiden mutation, bilateral severe planovalgus deformity, and right leg deep vein thrombosis episode in December 2021, for which a chronic anti-thromboembolic (VTE) protocol with Rivaroxaban 20 mg twice daily was implemented. The patient's social history revealed he was a former heavy smoker (ceased 20 years prior), consumed alcohol occasionally, and had no history of chemotherapy or occupational neurotoxic exposures. The patient had a history of impaired fasting glucose in the context of class II obesity and was receiving metformin therapy under endocrinology specialist care as prophylaxis against progression to type 2 diabetes mellitus. At presentation, fasting glucose, random glucose, and HbA1c values were within normal range, and the patient did not meet diagnostic criteria for diabetes mellitus. The patient was receiving follow-up care at an outpatient wound care clinic for advanced wound management two years prior following a mechanical stress ulcer diagnosis on the left second toe approximately which progress toward complete resolution.

He presented to the emergency department in September 2022 due to a clinical deterioration of chronic feet ulcers manifested in May 2022 with

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Fig. 1. Bilateral foot ulcers. (A) Left foot dorsal view. (B) Left foot plantar view. (C) Right foot dorsal view. Right foot plantar view.

recent episode of fever, worsening foot pain significantly limiting ambulation, and a positive methicillin-resistant S. aureus (MRSA), C. striatum, and E. *faecalis* foot ulcer swab. The small lesions progressively expanded over four months to involve all digits and plantar surfaces of both feet, representing a clear timeline of deterioration to severe bilateral osteomyelitis requiring hospitalization.

Physical examination revealed massive bilateral lower extremity oedema, particularly affecting the first three digits, with multiple ulcerations predominantly located on both great toes in the plantar region and on the second and third toes of the left foot (Fig. 1).

Laboratory studies demonstrated an elevated C-reactive protein (CRP) of 119/5 mg/L and Hb 11,3 g/dL. HbA1c was on range. Bilateral foot X-Rays obtained during admission demonstrated extensive osteolytic changes affecting multiple phalanges bilaterally, with particularly severe involvement of the distal phalanx of the left third toe and complete destruction of the right first toe distal phalanx (Fig. 2).

He was subsequently admitted to the Department of Infectious Diseases with a diagnosis of skin and soft tissue infection, ulcers, and bilateral foot osteomyelitis.

Multiple wound samples for microbiological cultures were collected and the antibiotic therapy protocol (ATB) was then initiated empirically on vancomycin 1,5 g intravenously twice daily for 11 days. Swab cultures were positive for methicillin-sensitive *S. aureus* (MSSA), *C. striatum* bilaterally so that ATB was switched to linezolid 600 mg orally twice daily based on cultures assessment.

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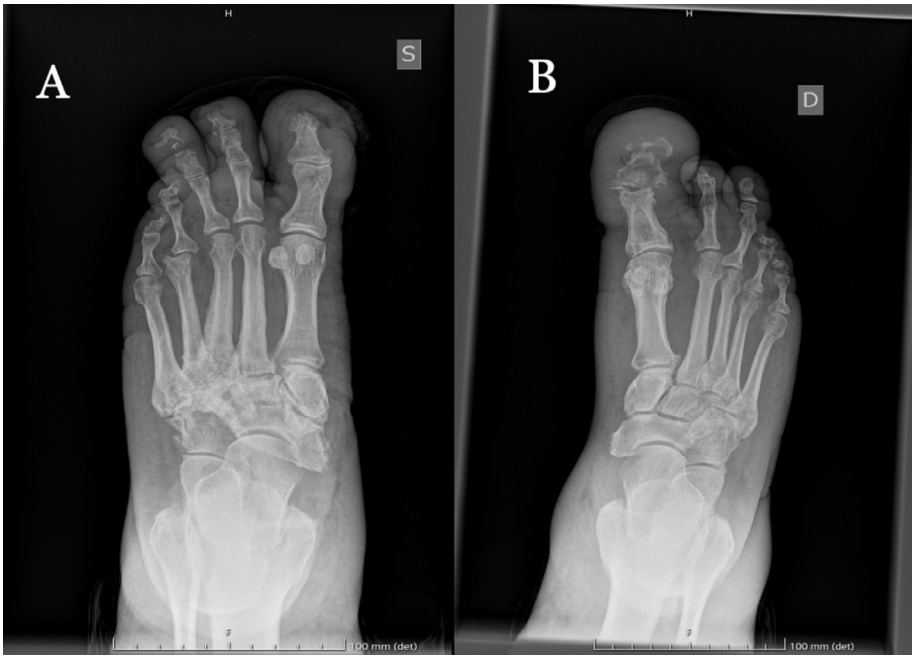

Fig. 2. The X-Rays demonstrated lithic alteration of numerous phalanges. (A) Left foot. (B) Right foot.

Foot oximetry was performed, revealing distal values of 28,4 mmHg and proximal values of 61,0 mmHg. Ankle-brachial index with echo-color Doppler confirmed triphasic flow of excellent amplitude throughout the femoro-popliteal-tibial axis, preserved bilaterally to the ankle level.

Bilateral foot magnetic resonance imaging (MRI) demonstrated, in the right foot, signs of bone resorption involving the distal phalanges of the first, second, and third digits, with marked signal changes extending to the proximal phalanx and first metatarsal. Additionally, fluid collection was evident at the apex of the first digit (Fig. 3A and B). The left foot showed marked bone resorption of the second and third digit distal phalanges, extending into the distal half of the middle phalanges of the second and third digits (Fig. 3C and D).

In October, after multidisciplinary consultation, the team acquired the informed consent to perform a two-stage surgical debridement.

During the first stage, new tissue samples were obtained for aerobic, anaerobic, and histological examination, which subsequently grew *C. striatum* and methicillin-sensitive *S. aureus* (MSSA), bilaterally (Table 1). Antibiotic-loaded beads containing vancomycin and amikacin were placed bilaterally. The ulcers were dressed in silver alginate, and superficial VACtherapy was applied to the left plantar ulcer to enhance granulation tissue formation, reduce wound edema, decrease bacterial load through continuous exudate removal, and accelerate wound contraction.

Following surgery, pain management included Paracetamol 1 g 3 times per day and Dicloreum 150 mg 1 times per day. The same Rivaroxaban 20 mg twice daily was implemented as VTE prophylaxis, and walking was not allowed. Daily hyperbaric oxygen therapy sessions were implemented for 12 days postoperatively. Wound assessment was performed every three days: a significant improvement in both oedema and erythema was noted three days following surgery. Additionally, non-invasive superficial debridement of the fibrotic tissue in the plantar ulcers of the first digits of the right foot was performed.

After 13 days following first stage debridement, a second stage new extensive debridement was performed. In the right foot, debridement extended to the bone level, confirming severe compromise of bone and perilesional soft tissue. A bone flap was created at the level of the first digit second phalanx, followed by debridement of cancellous bone, irrigation with normal saline, betadine, and hydrogen peroxide, and placement of oxacillin-loaded antibiotic beads before bone flap closure. In the left foot, a medial longitudinal incision was made at the first digit and apex of the second and third digits. Moderate bone and perilesional soft tissue compromise was identified, followed by debridement, irrigation with normal

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Fig. 3. MRI images of the bilateral foot showing extensive soft tissue edema and inflammatory changes. (A—B) The right foot demonstrated near-complete resorption of the first digit distal phalanx with joint effusions and fluid collections along flexor tendons with anterior fistulization. (C—D) The left foot showed resorption of the third digit distal phalanx and partial resorption of the second digit distal phalanx. Both feet exhibited diffuse degenerative changes with subcortical bone edema, particularly prominent in the left hindfoot and midfoot regions, with subchondral bone lacunae at the metatarsophalangeal joints.

saline, betadine, and hydrogen peroxide, and insertion of the same oxacillin-loaded antibiotic beads. New biopsies were intraoperatively collected to perform cultural assessment that resulted to be negative. The same Rivaroxaban 20 mg twice daily was implemented as VTE prophylaxis, and walking was not allowed.

On November, five days following the second stage, the patient was discharged from the infectious diseases department with marked improvement in edema and pain (Fig. 4). Discharge medications included trimethoprim-sulfamethoxazole three times daily and levofloxacin 750 mg daily, with continued hyperbaric oxygen therapy and regular wound care. The isolated *C. striatum* was not addressed with antimicrobial therapy, as it was interpreted as a contaminant rather than a clinically significant pathogen. Antibiotics were discontinued after 8 weeks. Weight-

Table 1 Antibiotic sensitivity results from surgical biopsy.

Antibiotic	Result	MIC (mg/L)
Staphylococcus aureus		
Clindamycin	S	≤0,25
Ciprofloxacin	I	≤0,5
Daptomycin	S	0,5
Erythromycin	S	≤0,25
Fusidic Acid	S	≤0,5
Gentamicin	R	>4
Levofloxacin	I	≤0,5
Linezolid	S	1
Mupirocin (high level)	R	>256
Mupirocin	R	>8
Moxifloxacin	S	≤0,25
Oxacillin	S	≤0,25
Quinupristin-dalfopristin	S	≤0,5
Tigecycline	S	0,25
Tobramycin	R	>4
Vancomycin	S	1
Trimethoprim/ Sulfamethoxazole	S	≤0,5/ 9,5
Ceftaroline	S	0,25
Tetracycline	I	2
Teicoplanin	S	≤0,5
Corynebacterium striatum		
Clindamycin	R	>1
Linezolid	S	≤1
Rifampicin	R	>1
Vancomycin	S	≤0,5

bearing ambulation was allowed using a Talus-type shoe on the right foot and a Taormina-type shoe on the left foot as part of a gradual mobilization protocol with specialized orthopedic footwear and two crutches.

The patient was followed as an outpatient over the subsequent months, demonstrating progressive ulcer healing and continuing to improvement. Detailed wound care protocols included hydrogen peroxide, betadine, and sterile saline irrigation, application of iodo sorbent powder, betadine-impregnated gauze dressings, sofargen cream twice daily for the left foot, and Amukina Med soaks with warm water.

One year postoperatively, the patient had returned to his normal daily activities without complications, including resumption of his professional work as an orchestra conductor. He reported complete resolution of pain and lower extremity oedema while maintaining meticulous foot hygiene and care. Clinical examination in December 2023 revealed well-healed surgical sites without signs of infection and complete restoration of toe mobility (Fig. 5). Long-term musculoskeletal complications were identified, including severe bilateral knee osteoarthritis requiring future surgical intervention, bilateral coxarthrosis, diffuse spondyloarthrosis with lumbo-sacral involvement, and significant flat foot deformity (Cobb angles: left 148°, right 144°), which resulted in compromised gait patterns and reduced capacity for long-distance ambulation.

Discussion

This case represents a bilateral severe osteomyelitis in a non-diabetic patient that demonstrated several unique characteristics, not yet reported in the literature. The combination of bilateral involvement, polymicrobial infection, extensive bone destruction, successful limb salvage through aggressive surgery and a multidisciplinary management, and long-term positive outcomes makes this case particularly distinctive. Another characterising finding was the presence of a concurring collapsed longitudinal arch of the foot due to a progressive collapsing flatfoot favoured by the severe obesity.

Fig. 4. Five days postoperatively following second stage. (A) Right toe volar view. (B) Right toe. (C) Left toe.

Fig. 5. One year after surgery, healing was complete. (A) Left foot. (B) Right foot.

The differential diagnosis for bilateral foot osteomyelitis in a non-diabetic patient includes several conditions that warrant consideration [7,8]. Primary considerations include septic arthritis with secondary bone involvement, malignancy with pathological fractures, inflammatory arthropathies such as rheumatoid arthritis or psoriatic arthritis, and Charcot neuroarthropathy [9—13]. Given the patient's history of factor V Leiden mutation and previous deep vein thrombosis, septic embolic phenomena could theoretically contribute to bilateral involvement, though this would be unusual for foot localization and factor V Leiden mutation has not been previously associated with osteomyelitis development in the medical literature [14]. The extensive bone destruction observed on imaging, combined with positive cultures for multiple pathogens, supported the diagnosis of osteomyelitis rather than alternative conditions [15,16].

While diabetes mellitus is the most recognized risk factor for osteomyelitis, accounting for the majority of cases, several factors likely contributed to the aggressive nature of infection in our patient [6,17]. The presence of obesity, arterial hypertension, and factor V Leiden mutation may have created a prothrombotic state with compromised microcirculation, facilitating bacterial seeding and persistence. The discrepancy between normal macrovascular Doppler and reduced transcutaneous oximetry values suggested the presence of small vessel disease, which may have further compromised tissue perfusion and contributed to the severity of the infectious process. However, the foot oximetry values were not considered completely reliable, as the massive oedema secondary to the infection may have interfered with accurate tissue oxygen measurement. Additionally, the patient's chronic lower leg ulcers provided a portal of entry for bacterial invasion, while the compromised local tissue environment may have impaired immune responses and delayed recognition of the developing infection.

The bilateral pattern was particularly remarkable, as most cases of osteomyelitis are unilateral [4]. Bilateral foot osteomyelitis typically occurs in diabetic patients with advanced peripheral neuropathy and vascular compromise [18]. In non-diabetic patients, bilateral involvement suggests either systemic predisposing factors or simultaneous local factors affecting both feet [2]. In this case, the chronic bilateral lower extremity oedema and multiple ulcerations likely created conditions conducive to bilateral bacterial invasion and establishment of infection.

The polymicrobial infection involving MSSA and *C. striatum* represented another distinctive feature of this case. While *S. aureus* remains the most common pathogen in osteomyelitis, polymicrobial infections are more commonly associated with diabetic foot osteomyelitis and chronic wounds [18]. The involvement of *C. striatum* is particularly noteworthy, as these organisms are typically considered skin commensals but can become pathogenic in

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compromised hosts or chronic wound environments [19]. However, *C. striatum* was not treated as the microbiological findings were interpreted as contamination, likely representing artifact rather than clinically relevant infection.

The successful management of this case required coordination between infectious disease specialists, orthopedic surgeons, wound care and soft tissue reconstruction specialists. This multidisciplinary approach enabled comprehensive assessment of infection control, surgical planning, and wound management. The involvement of multiple specialties ensured that both the infectious and mechanical aspects of the condition were addressed simultaneously, which was crucial for the successful outcome.

The use of antibiotic-loaded beads represented an advanced local antibiotic delivery system that provided high local concentrations of antimicrobials while minimizing systemic toxicity [20]. The placement of vancomycin and amikacin-loaded beads, followed by oxacillin-loaded beads in the second procedure, allowed for targeted therapy against the identified pathogens. The biodegradable calcium sulfate matrix of the beads provided sustained antibiotic release over several days, which is particularly valuable in treating chronic osteomyelitis and limited biofilm sprout.

The integration of HBOT in the treatment regimen reflects evidence-based adjunctive therapy for refractory osteomyelitis and flap survival by enhancing oxygen delivery to hypoxic tissues, improving antimicrobial efficacy, and promoting wound healing through angiogenesis and collagen synthesis [21,22]. The daily HBOT sessions in this case likely contributed to the successful treatment outcome by improving the local tissue environment for healing and enhancing the effectiveness of systemic antibiotics.

The achievement of complete healing with functional preservation represented an exceptional outcome for such severe bilateral osteomyelitis. This outcome was particularly significant given the initial severity of bone destruction and the high amputation risk associated with such extensive osteomyelitis [8].

This case provides valuable insights in several important ways. First, it demonstrated that severe osteomyelitis could occur in non-diabetic patients and should not be overlooked in the differential diagnosis of chronic foot ulcers. It illustrated the potential for successful limb salvage even in cases with extensive bone destruction when aggressive, multidisciplinary management is employed early and consistently. Lastly, it provided evidence supporting the use of combined local and systemic antibiotic therapy, staged surgical debridement, and adjunctive hyperbaric oxygen therapy in complex osteomyelitis cases.

The successful management approach described in this case can serve as a template for treating similar complex infections, potentially reducing amputation rates and improving functional outcomes. Furthermore, this case contributed to the limited literature on non-diabetic foot osteomyelitis characteristics and management, providing clinicians with reference data for similar presentations. The detailed documentation of the treatment protocol, including specific antibiotic choices, surgical techniques, and adjunctive therapies, offers practical guidance for managing comparable cases.

In summary, this case of bilateral severe polymicrobial osteomyelitis in a non-diabetic patient represented a rare and complex clinical presentation that was successfully managed through an aggressive multidisciplinary approach. The combination of repeated surgical debridements, antibiotic-loaded beads placement, targeted antimicrobial therapy, and hyperbaric oxygen treatment resulted in complete healing and functional preservation despite extensive initial bone destruction. This case demonstrates that limb salvage is achievable even in the most severe presentations of osteomyelitis when comprehensive treatment strategies are implemented early and maintained consistently.

Ethical Statement

The study was conducted in accordance with the Declaration of Helsinki.

Conflict of Interest

The authors have no relevant financial or non-financial interests to disclose with respect to the research, authorship, and/or publication of this article.

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the corresponding author on reasonable request

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References

[1] Dogan A, Irmak H, Harman M, Ceylan A, Akpinar F, Tosun N. tibial osteomyelitis following intraosseous infusion: a case report. Acta Orthop Traumatol Turc 2004;38(5):357—360.

[2] Waldvogel FA, Medoff G, Swartz MN. Osteomyelitis: a review of clinical features, therapeutic considerations and unusual aspects. 3. Osteomyelitis associated with vascular insufficiency. N Engl J Med 1970;282(6):316—322. https://doi.org/10.1056/NEJM197002052820606.

[3] Al-Obaidi I, Kendal A, Ramasamy A. Advances in foot and ankle surgery: a review of recent innovations. Bone Joint J 2025;107-B(3):283—290. https://doi.org/10.1302/0301-620X.107B3.BJJ-2024-0873.R2.

[4] Haji Zaine N, Hitos K, Vicaretti M, Fletcher JP, Begg L, Burns J. Characteristics of non-diabetic foot ulcers in Western Sydney, Australia. J Foot Ankle Res 2016;9:6. https://doi.org/10.1186/s13047-016-0137-6.

[5] Lee MC, Hua YM, Toh HS, Su HC, Chen PJ. A systematic review and meta-analysis of randomized controlled trials of systemic antibiotics for diabetes-related foot infections. Diab Vasc Dis Res 2025;22(1):. https://doi.org/10.1177/14791641241311293 14791641241311293.

[6] Lavery LA, Suludere MA, Ryan E, Crisologo PA, Tarricone A, Malone M, et al. The infected diabetic foot: analysis of diabetic and non-diabetic foot infections. Wound Repair Regen 2024;32(4):360—365. https://doi.org/10.1111/wrr.13162.

[7] Mustoe T. Understanding chronic wounds: a unifying hypothesis on their pathogenesis and implications for therapy. Am J Surg 2004;187(5A):65S—70S. https://doi.org/10.1016/S0002-9610(03)00306-4.

[8] Wernecke J, Wernecke M, Ebenau O, Spruth B, Kramer M, Vogelmann T, et al. Epidemiology and the medical burden of diabetic foot ulcers especially in patients with infection-a population-based analysis from Germany. Int Wound J 2025;22(4):. https://doi.org/10.1111/iwj.70157e70157.

[9] Kaminski M, Frescos N, Tucker S. Prevalence of risk factors for foot ulceration in patients with end-stage renal disease on haemodialysis. Intern Med J 2012;42(6):e120—e128. https://doi.org/10.1111/j.1445-5994.2011.02605.x.

[10] Lindholm C, Bjellerup M, Christensen OB, Zederfeldt B. A demographic survey of leg and foot ulcer patients in a defined population. Acta Derm Venereol 1992;72(3):227—230.

[11] Boulton AJ, Armstrong DG, Albert SF, Frykberg RG, Hellman R, Kirkman MS, et al. Comprehensive foot examination and risk assessment. A report of the task force of the foot care interest group of the American Diabetes Association, with endorsement by the American Association of Clinical Endocrinologists. Phys Ther 2008;88(11):1436—1443. https://doi.org/10.1093/ptj/88.11.1436.

[12] Shammas NW. Epidemiology, classification, and modifiable risk factors of peripheral arterial disease. Vasc Health Risk Manag 2007;3(2):229—234. https://doi.org/10.2147/vhrm.2007.3.2.229.

[13] Kidron A, Nguyen HH, Bayer J, Durkin M, Harris D, Dang H, et al. Salvage of chronic therapy-resistant bilateral charcot foot osteoarthropathy with signs of osteomyelitis. Orthop Surg 2022;14(7):1541—1544. https://doi.org/10.1111/os.13299.

[14] Alnor AB, Gils C, Vinholt PJ. Venous thromboembolism risk in adults with hereditary thrombophilia: a systematic review and meta-analysis. Ann Hematol 2024;103(10):4285—4294. https://doi.org/10.1007/s00277-024-05926-2.

[15] Kapoor A, Page S, Lavalley M, Gale DR, Felson DT. Magnetic resonance imaging for diagnosing foot osteomyelitis: a meta-analysis. Arch Intern Med 2007;167(2):125—132. https://doi.org/10.1001/archinte.167.2.125.

[16] Wudhikulprapan W, Phinyo P, Hadi A, Kanthawang T, Choudur HN. Diagnosing osteomyelitis in diabetic foot by diffusion-weighted imaging and dynamic contrast material-enhanced magnetic resonance imaging: a systematic review and meta-analysis. Clin Radiol 2024;79(11):805—817. https://doi.org/10.1016/j.crad.2024.07.015.

[17] Janssen LMA, van der Flier M, de Vries E. Lessons learned from the clinical presentation of common variable immunodeficiency disorders: a systematic review and meta-analysis. Front Immunol 2021;12:. https://doi.org/10.3389/fimmu.2021.620709620709.

[18] Yan T, Dou Z, Claire M, Ellen K, Caroline M. Risk factors for first-ever diabetes-related foot ulcer: a systematic review and meta-analysis. Int Wound J 2025;22(8):. https://doi.org/10.1111/iwj.70728e70728.

[19] Nageeb WM, Hetta HF. Pangenome analysis of corynebacterium striatum: insights into a neglected multidrug-resistant pathogen. BMC Microbiol 2023;23(1):252. https://doi.org/10.1186/s12866-023-02996-6.

[20] Easwar VRR, Navaneethakrishnan R, Agharkar Y. A case report of acute on chronic osteomyelitis of distal femur managed with sequestrectomy, saucerization, and stimulan placement. J Orthop Case Rep 2025;15(7):163—167. https://doi.org/10.13107/jocr.2025.v15.i07.5808.

[21] Shimbo K, Kawamoto H, Koshima I. Role of hyperbaric oxygen therapy in maximizing flap survival in compromised free flaps: a case report. Eplasty 2024;24:e14.

[22] Ghayoumi S, Eslami R, Vasei N, Darvishi M, Bordbar H, Poorshafagh H, et al. Use of hyperbaric oxygen therapy to treat a pressure ulcer complicated by osteomyelitis: a case report. J Wound Care 2024;33(1):72—74. https://doi.org/10.12968/jowc.2024.33.1.72.