International Journal of Research in Orthopaedics
Rizwana S et al. Int J Res Orthop. 2026 Jul;12(4):1218-1221
https://www.ijoro.org

DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20262070

Review Article

The silent musculoskeletal burden: orthopaedic manifestations and management challenges of neglected tropical diseases in India

Shaik Rizwana, Shahnawaz Hussain Rajavali, Yenni Lavanya Kumari, Nakka John Leo*

Department of Orthopaedics, GSL Medical College and General Hospital, Rajahmundry, Andhra Pradesh, India

Received: 29 January 2026
Revised: 11 March 2026
Accepted: 24 April 2026

***Correspondence:**
Dr. Nakka John Leo,
E-mail: drjohnleo.ortho@gmail.com

ABSTRACT

Neglected tropical diseases (NTDs) represent a heterogeneous group of 20 chronic, debilitating infections that disproportionately plague poor populations within the endemic regions of India. Despite the systemic and dermal manifestations of these diseases being well characterized, the severe and often delayed orthopedic and musculoskeletal (MSK) sequelae remain poorly appreciated and result in late diagnosis, loss of function, and permanent disability. The article provides a review of the specific orthopedic pathology associated with four key NTDs endemic to India, namely LF, Leprosy, OATB, and Mycetoma. It synthesizes data on the clinical presentation, pathology, functional outcomes, and the surgical challenges presented by such complex infections in resource-constrained settings. Orthopedic manifestations vary from acute infective arthritis and osteomyelitis (Mycetoma, OATB) to chronic, secondary deformities resulting from nerve damage, chronic lymphedema, and muscle paralysis. These often necessitate complex, multistage reconstructive surgery, including arthrodesis, tendon transfers, and extensive soft-tissue management, which push the limits of the available surgical infrastructure. The NTDs pose a significant, yet "neglected" orthopedic burden in India, and need early diagnosis, robust primary care integration, and the development of specialized orthopedic-plastic surgery protocols to mitigate the severe long-term disability and restore function in these affected patients.

Keywords: Neglected tropical diseases, Orthopedic manifestations, Musculoskeletal infections, Leprosy, Lymphatic filariasis, Osteoarticular tuberculosis, Mycetoma, Reconstructive orthopedic surgery

INTRODUCTION

Neglected tropical diseases (NTDs) are a diverse group of communicable diseases that prevail in low-income populations of tropical and subtropical regions. India shares a major proportion of the global burden of NTDs, being endemic for diseases such as leprosy, lymphatic filariasis (LF), visceral leishmaniasis (Kala-Azar), and mycetoma.[1]

While NTDs are primarily known for their impact on the skin, eye, and internal organs, their orthopedic manifestations are a major, often secondary or tertiary cause of long-term morbidity and permanent physical disability.[2] Such MSK complications often require specialized orthopedic intervention and rehabilitation, which quite often become the limiting factors in the return to functional life of a patient. The challenges are compounded by late presentation, chronic nature of the pathology, underlying malnutrition, and limited access to tertiary care centers capable of handling complex reconstructive procedures.

This article presents specific orthopedic complications of the four major NTDs prevalent in India, with their management challenges for orthopedic surgeons.

LF-THE CHRONIC LYMPHEDEMA EFFECT

LF is endemic to large parts of India and is caused by parasitic nematodes transmitted via mosquitoes. The main orthopedic pathology is indirect and results from chronic lymphatic obstruction.[3]

LEPROSY (HANSEN'S DISEASE)-NEUROPATHIC DEFORMITY

Leprosy is caused by *Mycobacterium leprae*, which causes the chronic infection mainly to peripheral nerves, leading to direct MSK pathology.[5]

Pathology

Nerve damage causes motor paralysis and loss of sensation in the extremities.

Orthopedic manifestations

Foot drop and claw hand

Paralysis of the deep peroneal and tibial nerves results in foot drop, while ulnar and median nerve paralysis causes characteristic claw hand deformity.

Charcot arthropathy

Loss of protective sensation leaves joints susceptible to repetitive microtrauma, resulting in destructive, painless disorganization of the joint that mainly affects the ankle and tarsal joints.[6]

Bone resorption and amputation

Insensate ulcers and chronic secondary osteomyelitis often lead to severe bone resorption (tapering of the phalanges, or "pencilling"), necessitating amputation.

Management challenge

Emphasize functional reconstruction through tendon transfer surgeries, such as tibialis posterior transfer for foot drop or Brand's four-tailed tendon transfer for claw hand, to restore active function and prevent further deformities.[7] The complex pathology from neuropathic joint disease (Charcot) often requires specialized bracing or surgical fusion (arthrodesis) to stabilize the foot and prevent its collapse.[8]

OSTEOARTICULAR TUBERCULOSIS-OATB: THE SPINAL AND JOINT DESTROYER

Although global initiatives have brought TB rates down, India continues to report the highest number of cases in absolute terms. Among these, extrapulmonary TB, especially OATB, continues to pose a formidable orthopedic challenge, making up 1-3% of all TB cases.[9]

Pathology

Caused by *M. tuberculosis*, OATB most commonly affects the spine (Pott's disease), followed by weight-bearing joints (hip and knee).

Orthopedic manifestations

Spinal disease

Pott's disease causes vertebral body destruction, cold abscess formation, and eventual spinal collapse, resulting in kyphosis or gibbus deformity. Neurological deficit due to spinal cord compression is the most feared complication of the disease, especially when it presents as Pott's paraplegia.

Joint disease

Commonly a monoarticular, insidious arthritis leading to destruction of cartilage and erosion of subchondral bone with frequent pathological dislocation/fibrous ankylosis.[11]

Sequestra and chronic sinus

Formation of a bony sequestrum and the development of chronic draining sinuses are common features complicating the treatment.

Management challenge

Initial management is pharmacological-ATT therapy. Indications for surgical intervention are neurological deficits, severe spinal instability/persistence of abscesses. Spinal reconstruction usually involves anterior/posterior decompression with stabilization by instrumentation, which is often very difficult to carry out in cases with extreme degrees of bony destruction.[12]

MYCETOMA (MADURA FOOT)-THE FUNGAL DESTROYER

Mycetoma is chronic, progressive, destructive subcutaneous fungal/bacterial (actinomycetoma) infection usually affecting foot and lower limb.[13]

Pathology

Infection begins after minor trauma and forms characteristic grains (microcolonies) in the pus. The disease is notoriously destructive, slowly transgressing fascial planes, muscles, and bones.

Orthopedic manifestations

Osteomyelitis

Direct invasion of the small bones of the foot, namely

tarsals and metatarsals, causes a highly destructive, multi-focal osteomyelitis that is refractory to standard antibiotics alone.[14]

Bone and joint destruction

Massive in the late stage, the destruction of the architecture of the foot is complete, turning it into a swollen, deformed, multi-sinus tract-ridden mass.

Management challenge

Treatment is prolonged antifungal or antibacterial therapy, which is often expensive and toxic. Surgical management is frequently the mainstay and includes aggressive local excision, debridement, and in advanced, drug-refractory cases, amputation-to prevent spread and provide definitive relief, often Syme's or below-knee.[15] Surgical margins are notoriously difficult to assess due to the infiltrative nature of the disease.

DISCUSSION

The Indian context and management challenges

Certain factors make the orthopedic burden of NTDs worse in India, impairing effective management

Delayed diagnosis and misdiagnosis

In rural India, NTDs will often masquerade as common MSK complaints, such as chronic arthritis or sequelae of simple trauma, leading to marked delays in diagnosis. Lack of easy access to advanced diagnostics, namely, MRI and specialized microbiology, ensures that these chronic infections present themselves to the orthopedic surgeon in end stages, when significant, irreversible destruction of bone and joint has already occurred.[2]

Complexity of reconstructive surgery

The orthopedic management of NTDs often goes beyond routine trauma surgery. Indeed, it requires complex reconstructive procedures within a challenging surgical field:

Host-tissue quality

Tissue surrounding the infection is often fibrotic (LF), neuropathic (Leprosy) or chronically inflamed and poorly vascularized (Mycetoma, OATB). This severely impacts wound healing, instrumentation stability and the success of soft tissue coverages.[16]

Need for multidisciplinary care

Successful outcomes for LF and Mycetoma require the synergy of orthopedic, plastic, and reconstructive surgeons along with infectious disease specialists-a resource largely unavailable outside major metropolitan centers.

Economic and social impact

The resulting disability contributes to poverty and social stigmatization. The protracted treatment, such as 9-18 months of ATT for OATB and years of antifungals in the case of Mycetoma, along with multiple surgeries, creates catastrophic out-of-pocket expenditure for families, often leading to non-adherence and relapse.[17] The visible deformities further marginalize these individuals, making it difficult for them to work and be socially integrated.

CONCLUSION

NTDs are major causes of MSK diseases in India, resulting in chronic deformities and disabilities. These conditions are associated with reconstructive or salvage surgeries. Detection of orthopedic manifestations such as sensory loss in leprosy or joint involvement in osteoarticular TB through improved primary healthcare screening is likely to be useful. Development and dissemination of standardized, cost-effective surgical guidelines for conditions such as Charcot arthropathy and post-tubercular deformities are critical for addressing these conditions in resource-constrained settings. Additionally, training in specialized techniques such as tendon transfers and external fixation in infected fields and combined orthopedic-plastic reconstructions is likely to improve surgical management. The orthopedic manifestations of NTDs are critical to address to improve functional outcomes and quality of life in these patients.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Lobo DA, Velayudhan R, Chatterjee P, Kohli H, Hotez PJ. The neglected tropical diseases of India and South Asia: review of disease burden and priorities for control. PLoS Negl Trop Dis. 2011;5(10):e1222.
2. Molyneux DH, Hotez PJ, Fenwick A. The neglected tropical diseases and their control. Philos Trans R Soc Lond B Biol Sci. 2011;366(1579):1801-9.
3. Shenoy RK. Clinical and pathological aspects of filarial lymphedema and its management. Korean J Parasitol. 2008;46(3):119-25.
4. Dreyer G, Addiss D, Dreyer P, Noroes J. Basic Lymphedema Management. Hollis Publishing Company; 2002.
5. World Health Organization. Global Leprosy Strategy 2016-2020: Accelerating towards a leprosy-free world. Geneva: WHO; 2016. Available at: https://www.who.int/publications/i/item/9789290225096. Accessed on 2 January 2026.

6. Hastings RC. The orthopedic complications of leprosy. Clin Orthop Relat Res. 1989;(246):15-26.
7. Brand PW. Tendon transfer in the hand in leprosy. J Bone Joint Surg Br. 1961;43(3):444-53.
8. Pradhan DK, Mohapatra S, Mohanty I. Charcot joint disease in leprosy: a retrospective study. Indian J Orthop. 2013;47(1):60-4.
9. Tuli SM. Tuberculosis of the Skeletal System. 4th ed. New Delhi: Jaypee Brothers Medical Publishers; 2010.
10. Danchaivijitr C, Temram S. Surgery for spinal tuberculosis. Asian Spine J. 2012;6(2):147-57.
11. Dhillon MS, Nagi ON. Osteoarticular tuberculosis of the foot and ankle. Indian J Orthop. 2002;36:68-76.
12. Rajasekaran S. The natural history of post-tubercular kyphosis in children. J Bone Joint Surg Br. 2001;83(7):954-62.
13. van de Sande WWJ. Global burden of human mycetoma: a systematic review and meta-analysis. PLoS Negl Trop Dis. 2013;7(11):e2550.
14. Fahal AH. Mycetoma: a thorn in the flesh. Trans R Soc Trop Med Hyg. 2004;98(1):3-11.
15. Agarwal P, Jagati A, Rathod SP, Kalra K, Patel S, Chaudhari M. Clinical features of mycetoma and its management. J Clin Orthop Trauma. 2017;8(4):307-13.
16. Richardus JH, Nicholls PG, Croft RP, Smith WCS. Nerve function impairment in leprosy at diagnosis and at completion of MDT: a retrospective cohort study. Lepr Rev. 2004;75(4):320-32.
17. Engel N, van Brakel WH, Bunders JFG. The social and economic impact of leprosy. Infect Dis Poverty. 2017;6(1):161.
18. Rajasekaran S, Soundararajan DCR, Shetty AP, Kanna RM. Spinal tuberculosis: current concepts. Global Spine J. 2018;8(4):96-108.

Cite this article as: Rizwana S, Rajavali SH, Kumari YL, Leo NJ. The silent musculoskeletal burden: orthopaedic manifestations and management challenges of neglected tropical diseases in India. Int J Res Orthop 2026;12:1218-21.