

# Tuberculosis of the Foot: What has Changed in the 21st Century?

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The current volume of the JFASAP has many articles discussing foot and ankle infections, especially tuberculosis (TB), which has remained the bane of doctors for many centuries. Even in the 21st century, as has been documented by a case series in the current volume by Pandey et al., as well as the case report by Mahajan et al., documenting a multifocal involvement, osteoarticular tuberculosis (OATB) remains a problem. Although there are no major demographic shifts in the incidence since our first publication in 1993, a major quantum of the problem is still being seen in the underdeveloped world.<sup>1</sup> Nevertheless, the HIV breakout in the 1980s, and subsequently the higher incidence of drug users and immune-compromised patients in the developed world has seen a significant resurgence of the disease even in the Western world.<sup>2</sup> Since 1990, however, many things have changed, with a significant change in presentations, diagnostic ability, and even the microbiological patterns seen.<sup>3</sup> This editorial is an outcome of our understanding of this disease over 35 years.

In the Indian subcontinent, despite TB being documented to be the predominant infection, many surgeons had limited awareness of TB involving the foot joints, foot and ankle TB accounts for less than 3% of the OATB cases. The diagnosis often just did not come to mind, which often leads to the issue of delayed recognition and similarly delayed treatment. All previous publications highlighted this point, in as much that the leaders in treatment strategy like SM Tuli and Shanmugasundaram propagated a strategy of a “*Therapeutic trial of anti-tubercular treatment*”.<sup>2</sup> This, however, was never recognized as an appropriate treatment worldwide since the definitive diagnosis of TB by either biopsy or culture was considered mandatory before initiating treatment; many discussions between the senior author and US surgeons have ensued at international conferences on this, with significant acrimony and often disagreements.<sup>4</sup>

Moving on to the 21st century, most surgeons training in the latter half of the 20th century were becoming aware of the problem of foot TB, and the diagnosis was actually done fairly early in many centers. Investigative modalities had significantly developed, and higher resolution CT scans were showing destructive lesions earlier, while MRI were showing signal changes in bone in early clinical disease. This tilted the scales towards the other side, with many diverse conditions being misdiagnosed as TB, leading again to improper treatment. That is exactly what the case report by Pravin Pandey in the current issue discusses and warns against; all osteolytic lesions are not TB in the foot, and signal changes on MRI often only indicate physiological variations or marrow edema. None of these confirms the diagnosis of TB, although experienced surgeons could correlate clinical features with advanced radiology and come up with the diagnosis. Experience, however, often leads to a bias; even with the senior author’s vast experience in foot and

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ankle TB, the tendency remains to overdiagnose TB as a cause of foot infectious or inflammatory disease.

So what has changed over the years? One thing that has remained a constant is the fact that confirmation of the diagnosis is done by acid-fast bacilli culture, and occasionally by a histopathological picture which indirectly points to this. In this paucibacillary disease, what has actually changed is how we can increase the chances of picking up the mycobacterium, using advanced methodology and testing.

We have successfully used multiplex polymerase chain reaction as a technique in which two or more gene targets are amplified in a single reaction, increasing the sensitivity of diagnosis, as a single gene target may be absent in some TB Bacterial strains.<sup>5</sup> We then started using loop-mediated isothermal amplification,<sup>6</sup> which was shown to be a cost-effective and reliable tool for early diagnosis in many cases of OATB. We have taken this one step further since the issue of drug resistance is emerging. Real-time quantitative polymerase chain reaction and high-resolution melt-curve analysis allow for simultaneous diagnosis of OATB and drug resistance,<sup>7</sup> with 100% specificity, and picking up cases which could be potentially drug-resistant. These revolutionary methods are now available in most cities in Asia, but awareness about their availability is limited, which we hope this editorial will address.

So where do we stand today? TB of the skeleton remains a significant problem, and confirmation of the diagnosis is often an issue, despite vast advances in medical technology. Cost constraints, lack of awareness, and noncompliant patients still remain the major issue, which has led to a significant increase in multidrug-resistant organisms. Who has won the battle, the bug or the doctor? In our opinion, it is a draw currently, as both have changed and evolved. The surgeon has a better understanding and awareness, better diagnostic tools, and maybe even better intervention methods,<sup>8</sup> as we now recognize when we can surgically intervene to minimize the effect of the disease. On the contrary, the bug is also winning

in some ways, as it has clearly developed better ways of beating the available drugs for its management. We are running out of second-line drugs, and no great antibiotic development seems to be on the horizon. In a nutshell, management of foot and ankle TB involves good clinical diagnostic skills, clear understanding of disease progression to abort joint invasion, and application of newer diagnostic capabilities to confirm the diagnosis, followed by appropriate medical or surgical management. Both the bug and the healer have won some battles, but the war seems to be never-ending.

## REFERENCES

1. Dhillon MS, Sharma S, Gill SS, et al. Tuberculosis of bones and joints of the foot: an analysis of 22 cases. *Foot Ankle* 1993;14(9):505–513. DOI: 10.1177/107110079301400904
2. Dhillon MS, Tuli SM. Osteoarticular tuberculosis of the foot and ankle. *Foot Ankle Int* 2001;22(8):679–686. DOI: 10.1177/107110070102200812
3. Dhillon MS, Aggarwal S, Prabhakar S, et al. Tuberculosis of the foot: an osteolytic variety. *Indian J Orthop* 2012;46(2):206–211. DOI: 10.4103/0019-5413.93683
4. Dhillon MS, Nagi ON. Tuberculosis of the foot and ankle. *Clin Orthop Relat Res* 2002;(398):107–113. DOI: 10.1097/00003086-200205000-00015
5. Sharma K, Sharma A, Sharma SK, et al. Does multiplex polymerase chain reaction increase the diagnostic percentage in osteoarticular tuberculosis? A prospective evaluation of 80 cases. *Int Orthop* 2012;36(2):255–259. DOI: 10.1007/s00264-011-1241-7
6. Sharma K, Sharma M, Batra N, et al. Diagnostic potential of multi-targeted LAMP (loop-mediated isothermal amplification) for osteoarticular tuberculosis. *J Orthop Res* 2017;35(2):361–365. DOI: 10.1002/jor.23293
7. Sharma K, Sharma M, Sharma A, et al. Diagnosing osteo-articular tuberculosis and multidrug resistance using real-time polymerase chain reaction and high-resolution melt-curve analysis. *J Orthop Res* 2022. DOI: 10.1002/jor.25410
8. Dhillon MS, Agashe V, Patil SD. Role of surgery in management of osteo-articular tuberculosis of the foot and ankle. *Open Orthop J* 2017;11:633–650. DOI: 10.2174/1874325001711010633