

INTRODUCTION

Two sets of remains in the Giecz Collection (11th - 12th c.) exhibit possible manifestations of leprosy, which may be the earliest cases from Poland. Although leprosy flourished throughout Europe during the Middle Ages¹, few cases have been reported in either the historic or archaeological literature for the medieval period of Poland^{2,3,4,5}. This presentation describes two possible cases of leprosy observed in the Giecz Collection and offers differential diagnoses.

SKELETAL MANIFESTATIONS OF LEPROSY

Leprosy (Hansen's disease) is an infectious disease caused by *Mycobacterium leprae*⁶. Skeletal manifestations of leprosy are extensive, both for those directly and those indirectly caused by the bacteria, and too few to describe in this presentation. So called *facies leprosa*⁷ or rhinomaxillary syndrome⁸, osteomyelitis, and cortical non-pyogenic lytic foci are the direct effect of hematogenous spread of *M. leprae*, unlike the septic changes. Sepsis occurs when *pyogenic* bacteria invade the ulceration⁹ that result from injuries and tissue necrosis directly caused by *M. leprae*-induced neuropathy (both sensory and motor nerve damage). Neuropathic manifestations in the hand and foot bones occur in more advanced stages of leprosy, yet are the most common joint lesion reported for this disease¹⁰.

CASE 1

—Grave 7/02 is an adult of undetermined sex. Inflammatory changes are observed on the left fibula (Fig. 1), including prolific subperiosteal reaction along the anterior border (Fig. 1a) and less-severe periosteal reactions on the lateral surface (Fig. 1b). The left talus exhibits lipping and osteophytes along the margins of the flexor hallucis longus tendon groove (Fig. 2). The head of the left 1st metatarsal (Fig. 3) is resorbed with bony spicules remaining. The left 2nd metatarsal (Fig. 3) exhibits osteophyte formation along the lateral edge of the proximal dorsal surface. The only possible manifestations observed on the left lateral and intermediate cuneiforms are osteophytes on the dorsal surface.

—On the right side, the head of the 2nd metatarsal (Fig. 4a) is completely resorbed (pencil), and there is atrophy of the distal. The 3rd metatarsal (Fig. 4b) also exhibits resorption/deformation of what is left of the head. Proximal and intermediate pedal phalanges (Fig. 4c) demonstrate ankylosing. The proximal phalanx in particular exhibits complete resorption of the proximal base and atrophy of the shaft, while the intermediate exhibits resorption of the base on the plantar surface and osteophyte formation on the dorsal surface. The cuneiforms, navicular, and cuboid all exhibit the same osteophyte formation observed on the left side, while the navicular also exhibits lytic lesions on the proximal surface (talus articulation).

—In addition, one unisided proximal pedal phalanx shows early signs of resorption of the base and in another proximal pedal phalanx, atrophy of the shaft.



FIG. 1. Case 1, left fibula with inflammatory/periosteal reactions, medial view (left) and lateral view (right)

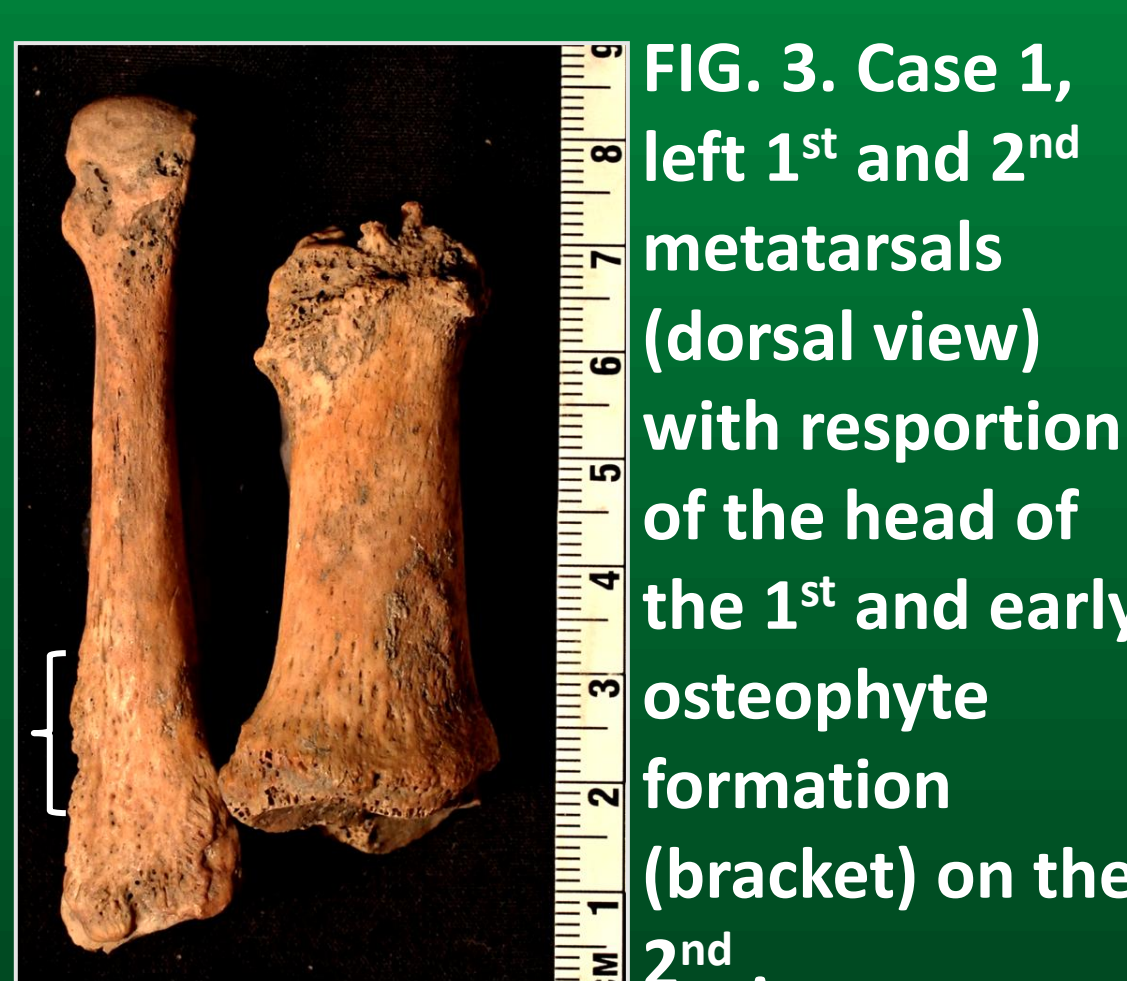
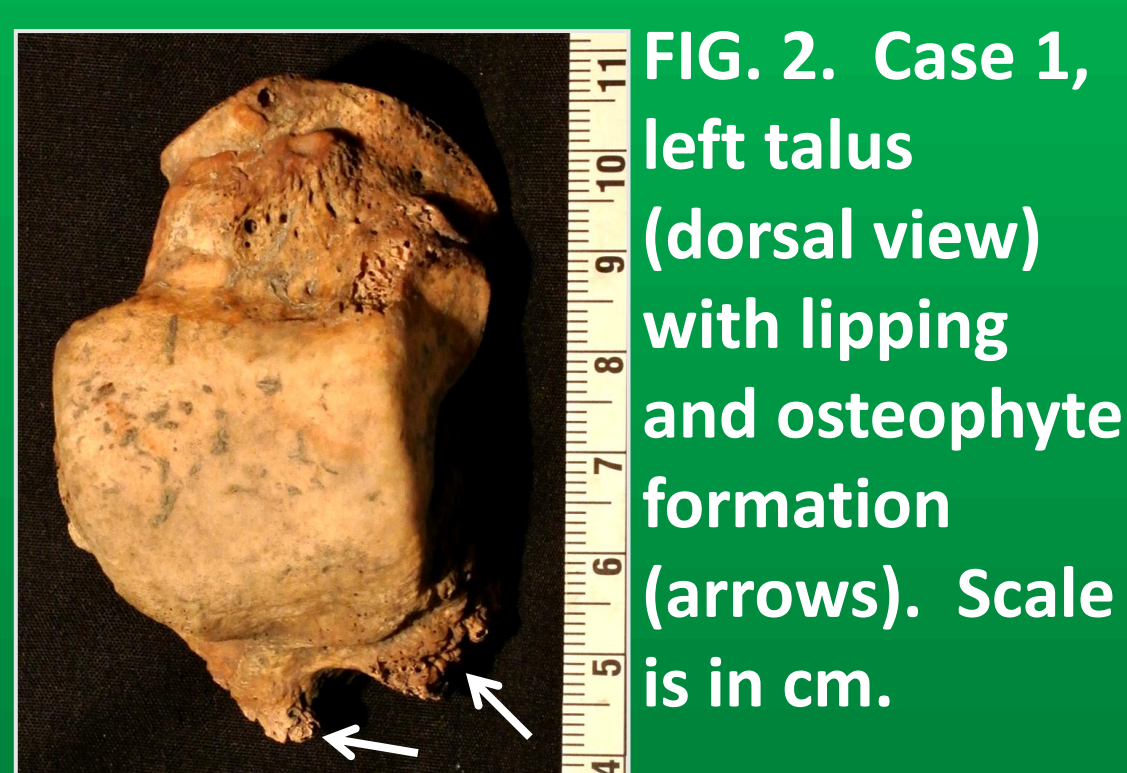


FIG. 2. Case 1, left talus (dorsal view) with lipping and osteophyte formation (arrows). Scale is in cm.
FIG. 3. Case 1, left 1st and 2nd metatarsals (dorsal view) with resorption of the head of the 1st and early osteophyte formation (bracket) on the 2nd.



FIG. 4. Case 1, right (a) 2nd and (b) 3rd metatarsals (dorsal view) with resorption of the heads and (c) ankylosis of proximal and intermediate phalanges. Scale is in cm.

HISTORICAL CONTEXT

It is possible that leprosy was first introduced into Europe from Asia¹, the earliest cases emerging around 150 AD and increasing in prevalence between 1000 AD and 1400 AD¹⁰. Spread of the disease throughout Europe is attributed to the movement of individuals for the purpose of trade, military activity, and religious expedition¹¹. The first historic description of leprosy in Poland dates to around 1250/1260 AD¹² and prevalence of the disease is said to have peaked here between the 13th and 15th centuries¹³. The Giecz Collection (11-12th c.) includes skeletons that were buried at a historically important trade center and military post in the *Wielkopolska* region. Both tradesmen (local and foreign) and soldiers presented a viable opportunity for introduction of the disease to Giecz.

CASE 2

A deposit near grave 3/06 consists of a single set of adult remains of unknown sex and age. This case is limited to what appears to be the right 5th metatarsal and proximal pedal phalanx, which exhibit ankylosis (Fig. 5). The phalanx displays deformation and osteophyte formation. The metatarsal exhibits resorption of the distal head, bone formation on the lateral surface, and inflammatory changes and pitting throughout.



FIG. 5. Case 2, fused possible right 5th metatarsal and proximal pedal phalanx, (left) dorsal view, (middle) lateral view, and (right) medial view) exhibiting possible manifestations of leprosy. Scales are in cm.

DIFFERENTIAL DIAGNOSIS

Both sets of remains present changes that are characteristic of leprosy⁹, including the penciling effect⁶ observed in the right 2nd metatarsal of Case 1 and deformation and ankylosing of the pedal phalanges in Case 1 and the metatarsal/phalanx in Case 2. Unfortunately, without facial bones, leprosy cannot be definitely diagnosed in non-clinical/archeological remains, such as these presented here. Neuropathic skeletal manifestations of *M. tuberculosis* observed in the feet/legs are identical to those of leprosy, the main differences being that leprosy also affects the face and hands⁹. Small pox also occurred during medieval times in Europe and can include resorption in the lower limbs after necrotic tissue leads to gangrene¹³, as in leprosy¹⁴.

DISCUSSION AND CONCLUSIONS

Misdiagnosis may be one reason for such few cases reported for medieval Poland, both historically and in the archaeological literature. Misuse of terminology in antiquity and faulty translation of medical conditions may account for misrepresentation of the disease².

The prevalence of leprosy in medieval Poland may also be underscored because some cases have been described in archaeological reports and theses, but have failed to make their way into published literature. In addition, published cases have been limited to somewhat obscure, regional journals that are less accessible.

Although radiographic examination can offer more information, in the absence of facial bones, neither case can be definitively diagnosed. Where nonspecific skeletal changes fail to offer a diagnosis, detection of the bacteria itself may be the solution. Bacterial DNA has been successfully extracted from 300 AD remains¹⁵, as well as from other E. European medieval populations^{15,16}. Microbacterial cell walls of both *M. leprae* and *M. tuberculosis* have proven to be very resistant, even after death¹⁵. The authors propose to sample these two cases for microbacterial DNA in an effort to make a more definitive diagnosis. With the chance that these individuals were infected by multiple bacteria or one other than *M. lepra*, the sample comparison would not be limited to this bacteria alone. If confirmed, the remains presented here may be the earliest cases of leprosy in Poland.



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