Severe skeletal lesions and loss of bone mass in a child associated with a case of spinal tuberculosis and prolonged immobilization

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Introduction
Tuberculosis is caused by a bacterium that belongs to the Mycobacterium tuberculosis complex. Progression to skeletal tuberculosis is uncommon and presents differently in children and adults [1]. This paper describes a case of multi-focal skeletal changes in a juvenile that expands our understanding of health and disease in past populations.

Material and Methods
- Skeleton of a 9 year old girl who died of pulmonary tuberculosis, in Lisbon, Portugal in the 1940s (fig. 1)
- The individual is housed in the National Museum of Natural History and Science, Lisbon
- A macroscopic examination of the remains was carried out

Results
- Linear enamel defects on the anterior dentition (not shown)
- Lytic lesions on body of T4, complete destruction of bodies of T6 and T7, destructive lesions of body, pedicles, transverse processes on T12 (not shown)
- Complete destruction of vertebral end of right ribs 8-11 and left ribs 7, 9, and 11 (not shown)
- Swollen vertebral bodies of L1 and L2 (not shown)
- Remaining lesions shown on figures 2-9

Discussion
Diagnosis of tuberculosis faces many challenges as there is a lack of pathognomonic lesions [2]. Differential diagnosis in this case must consider diseases with similar skeletal changes which include brucellosis, osteomyelitis, actinomycosis, hypertrophic osteoarthropathy, and Scheuermann’s disease [3,4]. The destructive lesions, ankylosis, collapse, and kyphosis of vertebral bodies, follows the expected presentation of skeletal tuberculosis based on the operational definition [2]. Lytic lesions in ribs and vertebral arches is atypical. Atrophy of bone mass as seen in the lower limbs of this case suggests that the individual also likely experienced prolonged immobility during life [5]. Heterotopic ossification observed in the greater trochanter area is also consistent with immobility [6]. Disuse atrophy has been reported in another case of juvenile skeletal tuberculosis [7]. Small-for-age femora and enamel defects suggests that the individual was also ill for a long period of time. Plaster vests were common forms of treatment for spinal tuberculosis that required the patient to be immobilized, but it is unknown whether this child was being treated in this manner.

Conclusion
This study presents one of the few examples of tuberculosis in children, prior to the antibiotic era, documented with cause of death. It provides a reference of skeletal lesions for archaeological derived juvenile individuals who suffered from tuberculosis.