

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

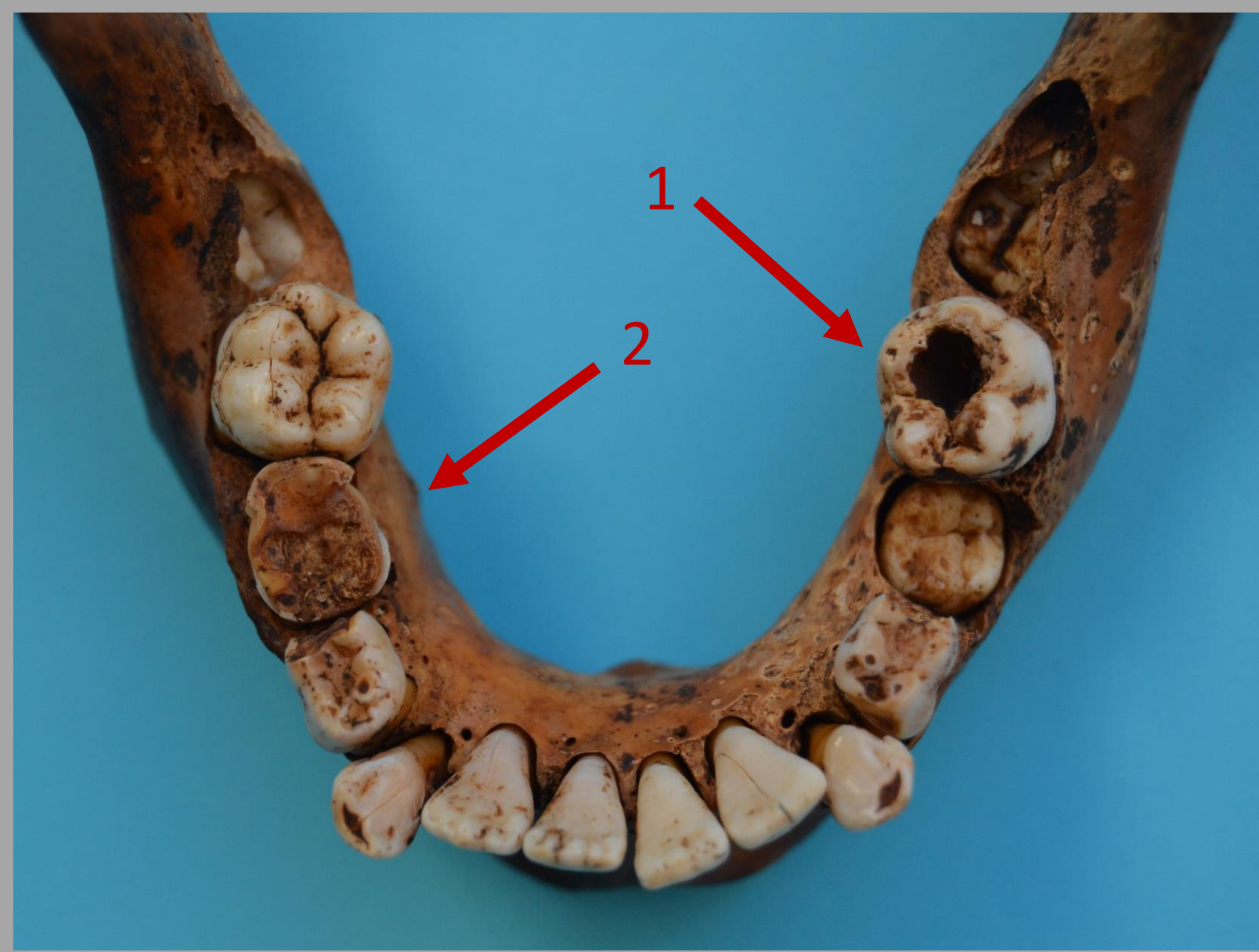


Fig. 2 Occlusal view of mandible, showing large occlusal pit cavity exposing the dentine on left M1 (arrow 1) and large caries lesions that destroyed most of the crown and exposing the dentine on the right dm2 (arrow 2).

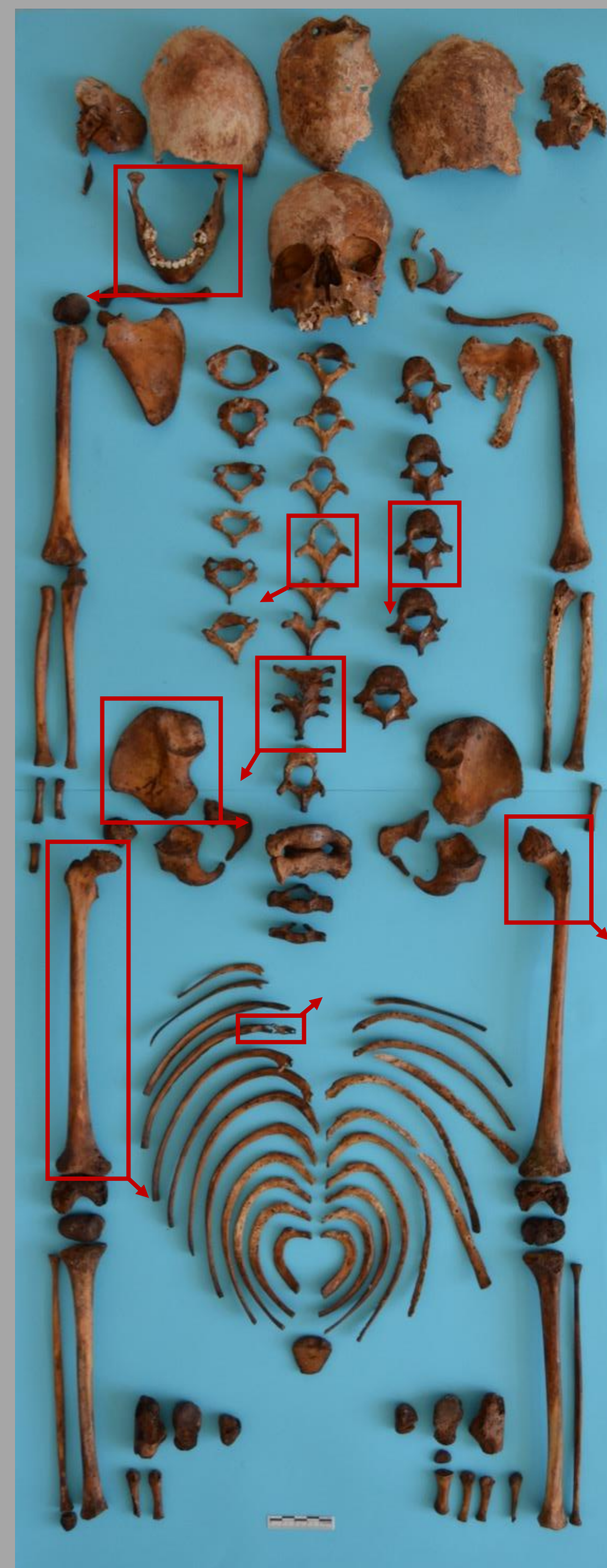


Fig. 1 Complete inventory



Fig. 6 Superior view of 9th right rib, showing the visceral and vertebral end with severe osteolytic lesions



Fig. 3 Superior view of T5, showing the central destruction of the vertebral body (arrow 1) and sclerotic margins of the lytic lesions (arrow 2)



Fig. 7 Comparative view of the right ilium (far right) and two other individuals of the same age, showing an atrophy of bone

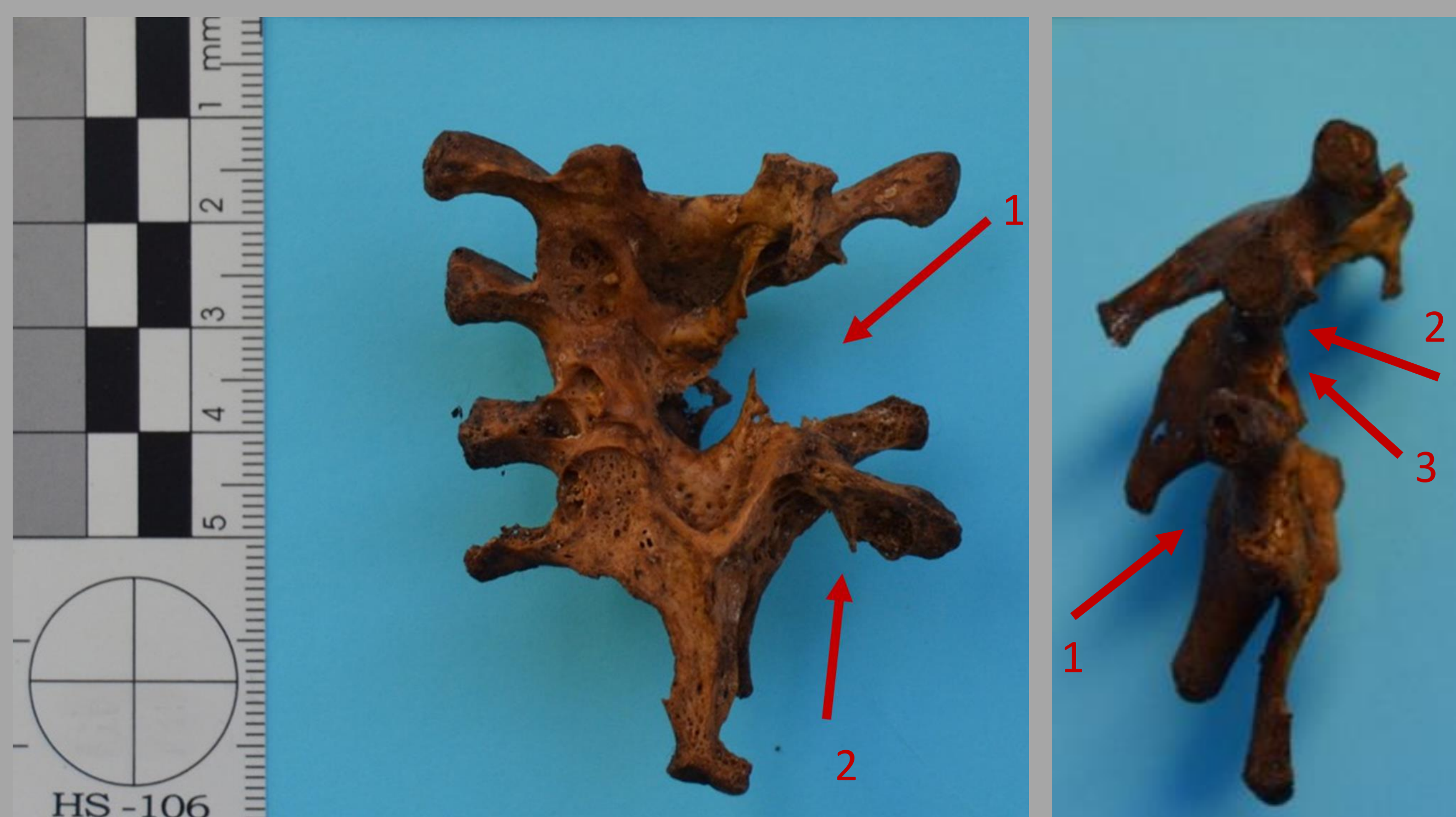


Fig. 4 Thoracic vertebrae T8-T11: Posterior view (left) - destruction of vertebral bodies, fusion of the vertebral arches, destruction of the left pedicle, transverse process, and lamina of T9 (arrow 1), and fracture of the left transverse process of T11 (arrow 2); Lateral view (right) - fusion of the vertebral arches (arrow 1), kyphosis of 60° (arrow 2), and complete destruction of the vertebral bodies (arrow 3)



Fig. 5 Lateral view of L3, showing the 'swollen puffy' vertebral body



Fig. 8 Comparative view of the right femur (arrow) smaller size when compared with other individuals of the same age



Fig. 9 Posterior view of the left femur, showing the premature fusion of the head (arrow 1) and greater trochanter (arrow 2), flattening of the greater trochanter and heterotopic ossification (arrows 2 and 3)

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 vertebrae 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.