

One of the Oldest Datable Skeletons with Leprous Bone-Changes from the Naestved Leprosy Hospital Churchyard in Denmark¹

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In 1948, one of us (V.M-C) found, and during the following twenty years carried out a systematic excavation of the forgotten site of the Naestved St. George's (St. Jørgens) Hospital, a medieval leprosy hospital active between about 1250 and 1550 A.D. (7, 16, 18).

At the concluding excavation in June 1968, when the burial places belonging to the hospital church dating from the last half of the 13th century were examined, there was found in the choir an untouched rectangular Romanesque grave (Fig. 1a & b) built of large medieval bricks with inside measurements of 70 x 180 cm. In the grave there was a well-preserved skeleton of a male, aged about 25-30 years, with typical leprous bone-changes.

The type of the grave and its placing at the most dignified place of the church, namely the choir, suggest that it was that of an important person. For lack of any grave-goods such as coins, signets or any other datable objects, it is impossible to date the grave more exactly than to the last half of the 13th century. The burial may have been that of the founder of the church.

The skeleton, measured in the grave, was 167 cm. long from vertex to malleoli interni, which corresponds to a stature of about 175 cm.

DESCRIPTION OF ANATOMIC FINDINGS

Skull. The anterior nasal spinous process has been lost by an erosive process *intra vitam*, leaving behind a pitted base. Similar

erosion and pitting is present on the left lower lateral portion of the nasal border. Multiple tiny erosions are found in the left lower turbinate bone. On removal of the teeth a minimal degree of resorption of the alveolar bone above the incisors can be recognized (Figs. 2a & b, 3 & 4).

In the posterior third of the hard palate, 1 cm to the left of the midline is a 1 cm perforation with an irregular eroded edge. A cluster of 1 to 2 mm perforations is present on the right side of the palate, 1.5 cm from the midline (Fig. 5).

The above group of lesions comprise the typical findings of *facies leprosa* (11, 14, 15, 17, 19, 22, 23, 28).

Two other abnormalities are present in the skull, but are not related to the leprous process. First, immediately posterior to the right occipitomastoid suture, the skull is thickened in a roughly diamond shape area, 4.0 x 5.0 cm. and rising 0.6 cm. above the level of the surrounding skull surface. At this point, the internal surface of the skull presents no abnormality (Figs. 3 & 6). Second, the posterior aspect of the posterior portion of the *sella turcica* is marked by asymmetric serpigineous grooves, more pronounced on the right, with intervening small mounds of bone. The grooves are up to 0.2 cm deep and appear to be impressions of vascular channels, probably associated with an atypical *plexus basilaris* (Fig. 7).

Feet. Changes in the left foot (Figs. 8 & 10) are restricted to the terminal phalanges of the first through fourth toes. The terminal phalanx of the fifth toe is missing. In all terminal phalanges there is erosion and pitting of the tufts with variable degrees of loss of these structures. An osteophyte is present on the lateral aspect of the first

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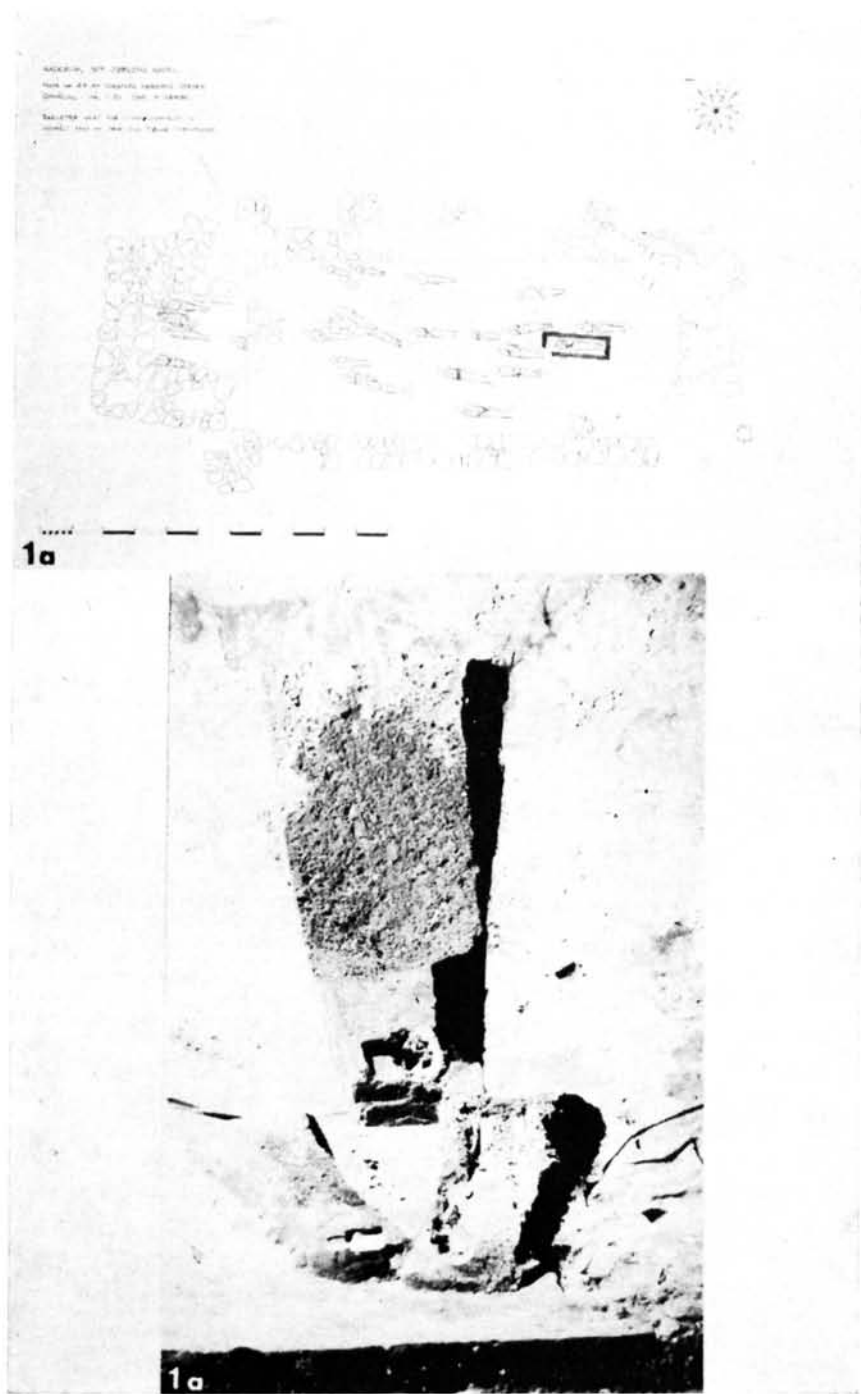
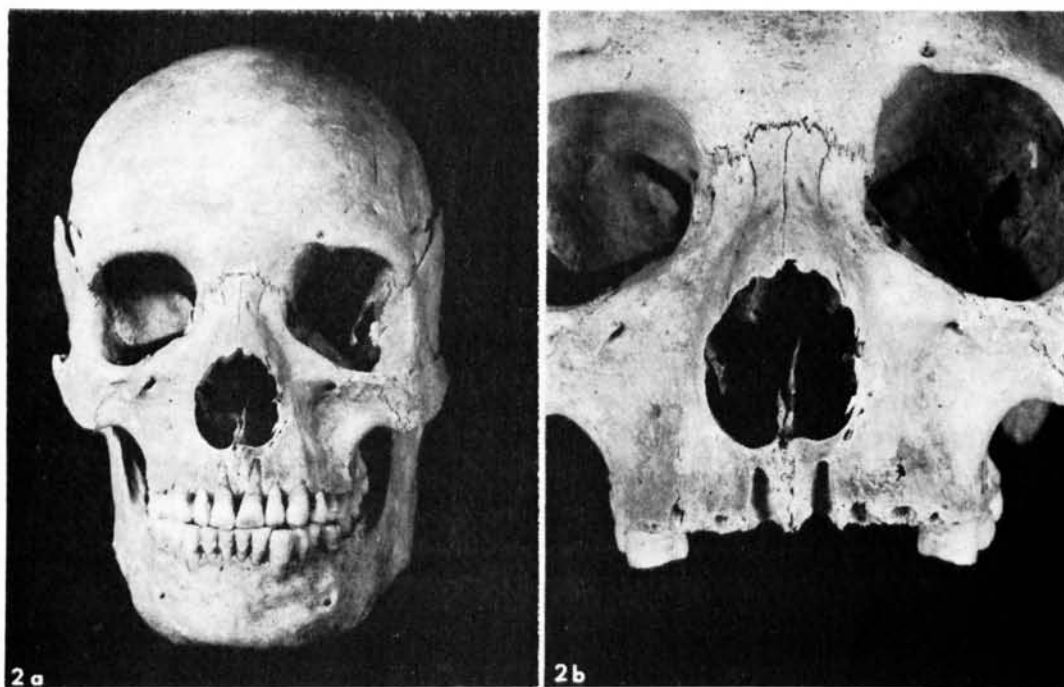


FIG. 1a. Tentative ground plan of the St. Jørgens Church with Romanesque grave.



FIG. 1b. Excavation in process.



FIGS. 2a & 2b. Anterior view of the skull which shows the typical *facies leprosa*.



FIG. 3. Lateral view of the skull from the right.



FIG. 4. Lateral view of the skull from the left.

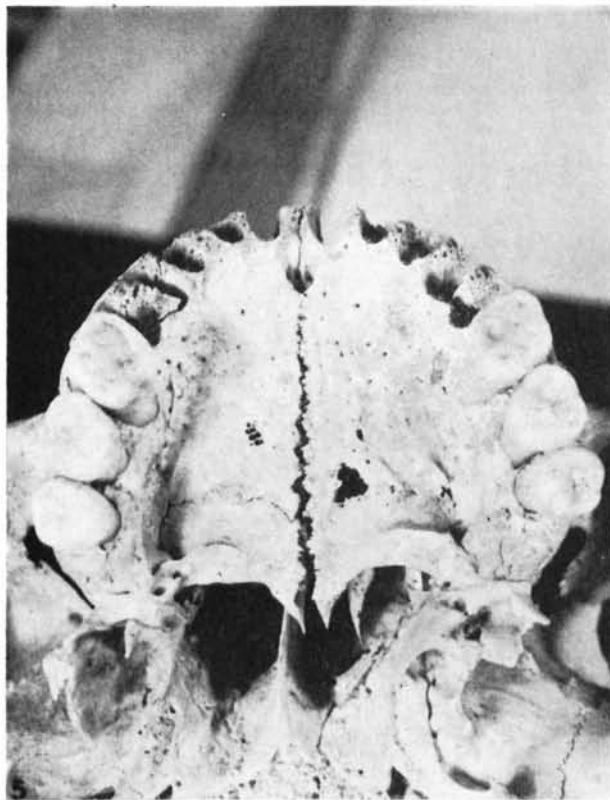


FIG. 5. The hard palate with perforations.



FIG. 6. The pathologic process of the right parietal bone (see text).



FIG. 7. Sella turcica, posterior aspect, with atypical vascular markings.



FIG. 8. Left foot (see text).

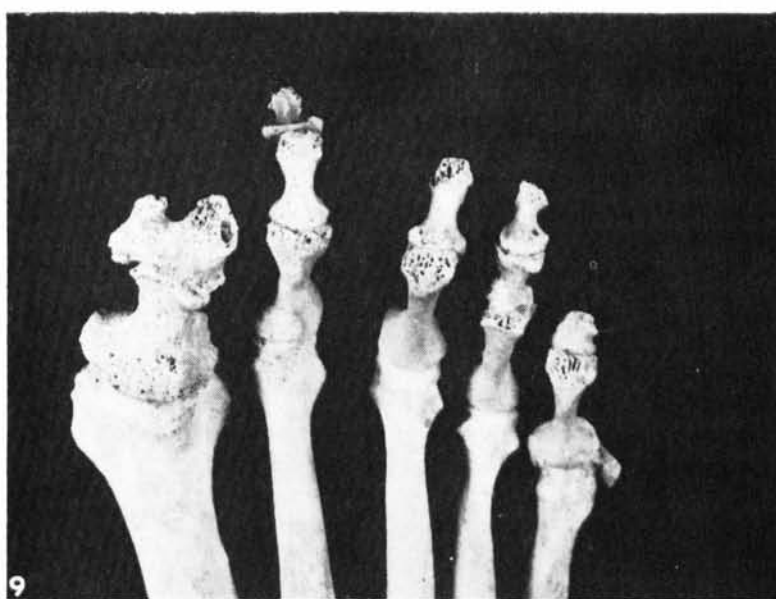


FIG. 9. Right foot (see text).



FIG. 10. Plantar surface of first left phalanx. Concavity due to leproma.

terminal phalanx. In addition, on the plantar surface of the first phalanx there is a deep ovoid depression, 3.0×5.0 mm and 3 mm deep (Fig. 10). The base of this depression has exposed cancellous bone and its outer edges present a minimal amount of new bone formation. This latter lesion is typical of that caused by a leproma involving both periosteal soft tissues and adjacent bone.

The right foot (Fig. 9) presents narrowing of the shafts of the proximal phalanges two, four and five, producing an hour-glass deformity. Terminal phalanx three is missing. A large osteophyte is present on the medial aspect of the first terminal phalanx.

In both feet, the symmetric lesions of the tufts and the hour-glass resorptive deformity are characteristic of the trophic changes

associated with neural lepromatous leprosy.

Tibiae and fibulae. (Figs. 11 & 12). There is bilateral focal periosteitic new bone formation in the mid and lower thirds of the shafts and a small similar focus on the left tibia in the upper posterior third near the *linea poplitea*.

Hands. All terminal phalanges of both hands which are available for study present minimal degrees of erosion and pitting of the tufts. The first terminal phalanx of the right hand also has a major degree of resorption of the shaft in the dorso-volar direction, such that it presents a "shark tooth" appearance (Figs. 13a & b), when viewed from the lateral aspect. Several of the proximal phalanges of the left hand show evidence of periosteitic new bone formation.

Clavicle. (Fig. 14) On the lower aspect of the inner third of the right clavicle adjacent to the *tuberositas costalis* is an ovoid erosion, 1.7×0.4 cm, which is 0.3 cm deep. The depths of the erosion exposes cancellous bone bordered by a rim of new bone formation. This lesion has the appearance of a focal chronic osteomyelitis, although the possibility of a lepromatous lesion cannot be excluded.

Upper extremities. (Fig. 15) There is a bilateral congenital absence of the bony plate at the base of the olecranon fossae of the *humeri*. The upper third of the right *radius* has a bony callus due to a healed fracture, with slight rotation of the distal shaft.

Vertebrae. There are minimal erosive foci in the centers of the articular facets of C-7, T-1, T-5 and T-8. A depression due to a Schmorl's node is present on the inferior surface of C-2. Unusually prominent bifid spinous processes of C-3, C-4 and C-5 are congenital variants.

PATHOLOGIC ANATOMIC DIAGNOSES

Low-resistance leprosy (lepromatous leprosy) with symmetrical trophic lesions of feet and hands and *facies leprosa*; periostitis of the tibiae and fibulae; localized bony destruction due to leproma, left foot; focal

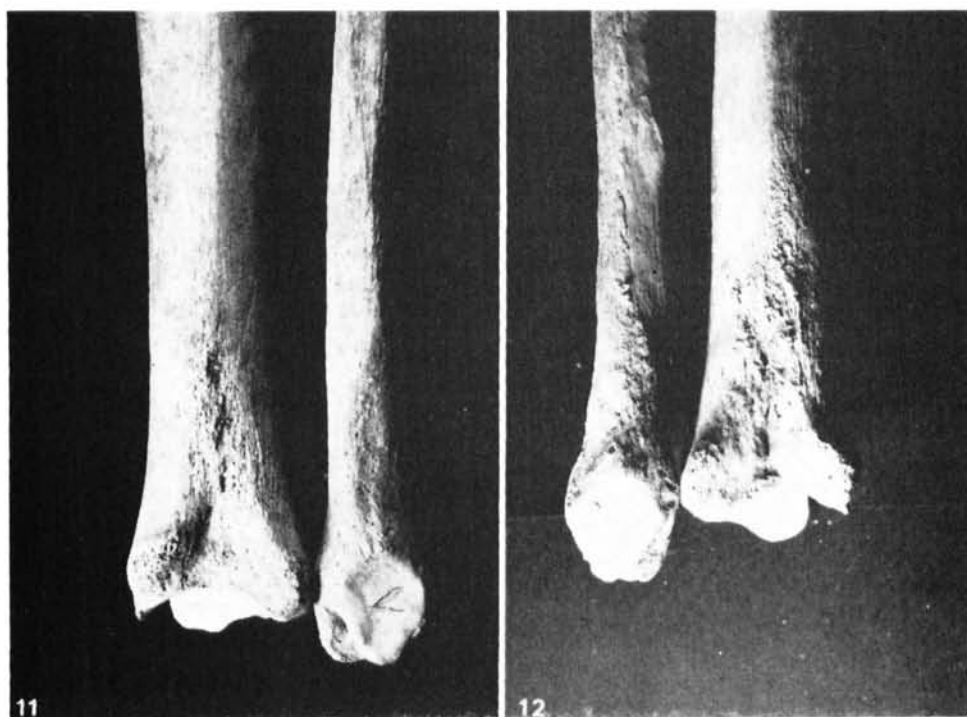
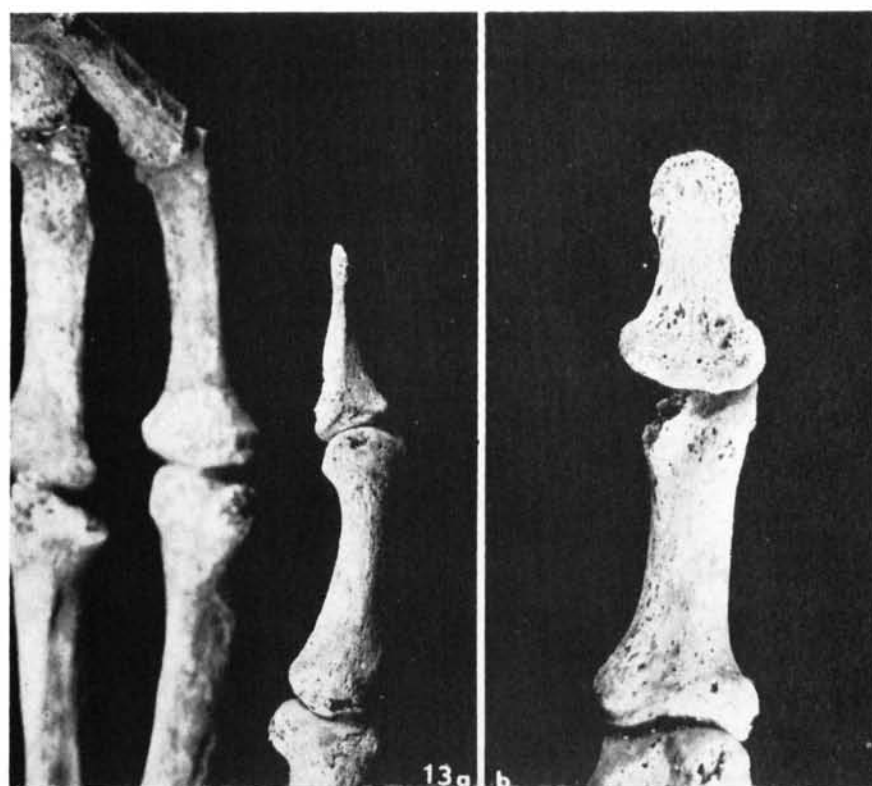


FIG. 11. Left tibia and fibula. Periosteitis. FIG. 12. Right tibia and fibula. Periosteitis.



FIGS. 13a and 13b. Right first terminal phalanx showing "shark-tooth" appearance.

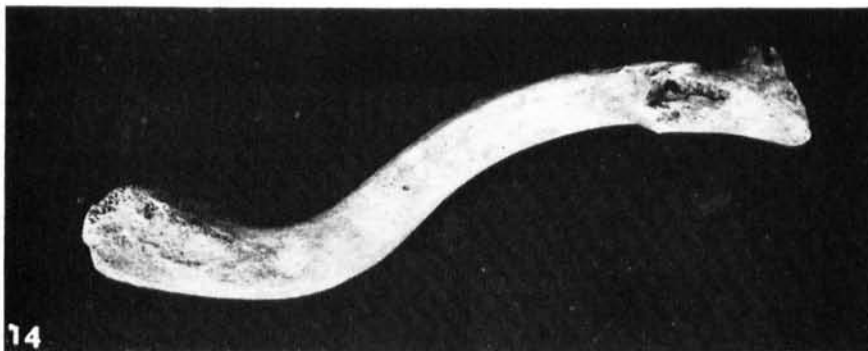


FIG. 14. Right clavicle, from below, showing erosive osteomyelitic (lepromatous) lesion.

chronic osteomyelitis, right clavicle (possibly lepromatous).

Early osteoarthritis, cervical and thoracic vertebrae; healed fracture, right radius; congenital absence of bony plate, olecranon fossae, bilateral; congenital variant bifid, spinous processes, C-3, C-4 and C-5; atypical vascular markings, posterior aspect of *sella turcica*.

DISCUSSION

Specific skeletal changes of low-resistance (lepromatous) leprosy included erosive changes of the anterior nasal spine and neighboring paranasal bony areas, resorption of the alveolar ridge with frequent loss of incisor teeth, and palatal

perforations (*facies leprosa*). Lepromata overlying bone are associated with erosive bony changes, suggesting a penetrating infectious process, with reactive formation of new bone producing a localized form of osteomyelitis.

Due to peripheral neural involvement by the infectious process, a variety of secondary skeletal changes may develop. The most characteristic of these are trophic reabsorptive changes in the terminal phalanges of the feet and hands; lesions which are compounded by repetitive microtraumas. The phalanges frequently are the site of other absorptive changes which lead to "shark-tooth" and "hour-glass" deformities.

Periosteitis, particularly of the tibiae and

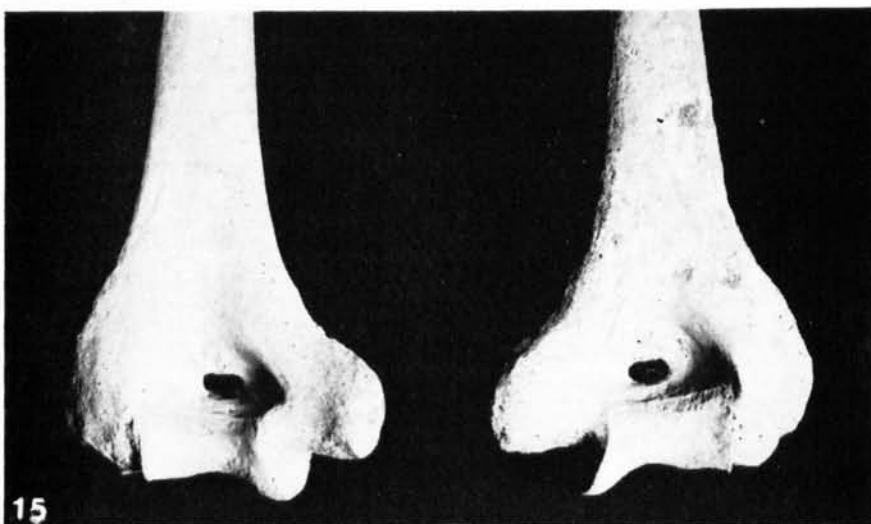


FIG. 15. Left and right humeri showing congenital variant of structure (see text).

fibulae, is a frequent finding and may be the consequence of ascending secondary infections or of periosteal involvement by the primary infection (1-6, 8-15, 17-20).

All of these characteristic changes have been found in a skeleton dated to the late 13th century unearthed in the medieval leprosy hospital of St. George in Naestved, Denmark. The location of the inhumation in the most important and dignified site in the church of the hospital suggests that the skeleton may have been that of the founder or patron of the establishment. This inhumation is one of the oldest of the skeletons with evidence of leprosy in the Naestved excavations.

SUMMARY

One of the oldest datable skeletons with the bone changes of leprosy from the St. George's Hospital, Naestved, Denmark, is described in detail. All of the major bone lesions of leprosy are represented.

RESUMEN

Se describe en detalle uno de los esqueletos más antiguos que se pueda ubicar en el tiempo, con las alteraciones óseas características de la lepra. Este esqueleto pertenece al St. George's Hospital, Naestved, Dinamarca. Todas las alteraciones mayores de la lepra están representadas.

RÉSUMÉ

On décrit ici en détail un des squelettes les plus anciens présentant des modifications osseuses dues à la lèpre, et dont l'âge puisse être établi, provenant de l'hôpital St. Georges, Naestved, au Danemark. Toutes les lésions osseuses principales de la lèpre sont présentes.

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