

Osteomyelitis of the Distal Phalanx of the Thumb due to *Parvimonas micra* and *Fusobacterium nucleatum*: A Case Report

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We herein report a case of osteomyelitis of the distal phalanx of the thumb of a 55-year-old man caused by *Parvimonas micra* and *Fusobacterium nucleatum*. Osteomyelitis often occurs in long bones and rarely occurs in the bones of the fingers. In addition, osteomyelitis of the finger frequently occurs after trauma or surgery, and blood-borne infection is very rare. *P. micra* and *F. nucleatum*, normal flora of the oral cavity, are very rare pathogenic bacteria of osteomyelitis except in periodontal disease, and there are no previous reports regarding the occurrence of osteomyelitis due to *P. micra* and *F. nucleatum* in the finger bones.

Keywords. distal phalanx; *Fusobacterium nucleatum*; osteomyelitis; *Parvimonas micra*; thumb.

CASE REPORT

A 55-year-old man previously visited a hospital on account of right thumb pain lasting for more than 2 months without any provoking causes. There was no history of trauma or complications to be noted, but the patient underwent hemisection for dental caries in his molar. The patient worked in the construction industry. As a construction worker, he did not suffer an injury or cut to his finger and did not put it in his mouth.

One week after the hospital visit, the patient was referred to our department. The first physical examination showed pain and tenderness in the right thumb but no local heat, redness, or obvious swelling. On the plain x-ray, the distal phalanx in the right thumb exhibited marked osteolysis (Figure 1). Magnetic resonance imaging (MRI) showed lesions with contrast effects of low intensity in a T1-weighted image and a mixture of high and low intensity in a T2-weighted image; however, there were no findings indicative of fluid retention. The complete blood count and serum chemistry showed a slight increase in white blood cells (WBC; 8640/ μ L), but neutrocytes were 65.4% and C-reactive protein (CRP) was 0.13 mg/dL.

As osteolysis of the distal phalanx was remarkable, a biopsy was performed because neoplastic lesions were suspected rather than infection. The bone cortex of the distal phalanx of the thumb was fragile and partially missing; however, no liquid accumulation was observed, and granulation-like tissue was collected from inside the distal phalanx and submitted for pathological diagnosis.

Although no inflammatory reaction was observed after the biopsy, his WBC and CRP increased to 13 970/ μ L and 3.66 mg/dL, respectively, on the eighth day after the biopsy. The plain x-rays showed further osteolysis of the distal phalanx, and enhanced MRI demonstrated a ring-like contrast and fluid retention indicative of an abscess (Figure 2). In the pathological diagnosis of the biopsy specimen, no obvious neoplastic tissues were observed, and remarkable neutrophil infiltration was observed, indicating an infection. With the diagnosis of osteomyelitis of the distal phalanx, we performed curettage and irrigation of the lesion on the eighth day after biopsy. Intravenous administration of cefotiam and oral clindamycin and trimethoprim-sulfamethoxazole were started after the surgery. Thereafter, the inflammatory findings of the blood test gradually improved, and it became normal in 2 weeks after the surgery. No bacteria were detected from the aerobic culture. Two types of bacteria, *P. micra* and *F. nucleatum*, normal flora in the oral cavity, were detected from the anaerobic culture of tissues collected during surgery. After the detection of bacteria, oral clindamycin and trimethoprim-sulfamethoxazole were continued.

Bone formation in the distal phalanx was gradually observed on the plain x-rays, and local symptoms disappeared. The antibiotics were given for a year, until the bone remodeling of the phalanx was almost completed. Two years after the surgery, no relapse of infection was observed (Figure 3).

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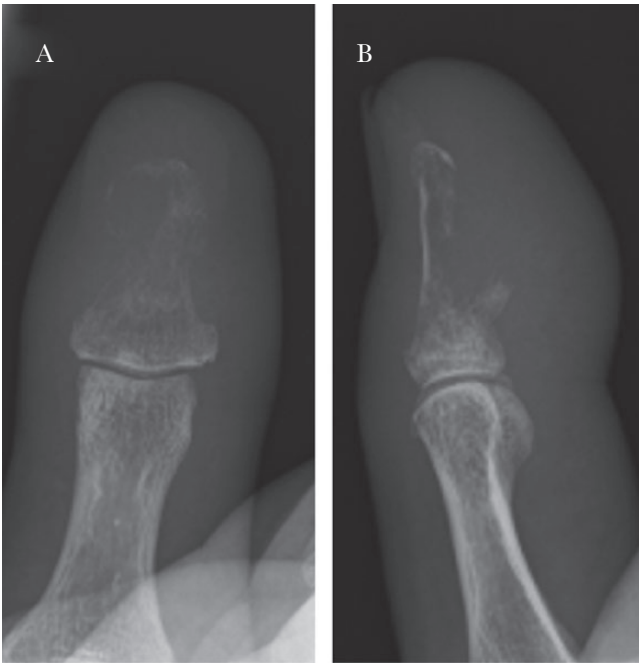


Figure 1. Plain x-ray images of the phalanx of the right thumb at first presentation. A, Frontal view. B, Lateral view.

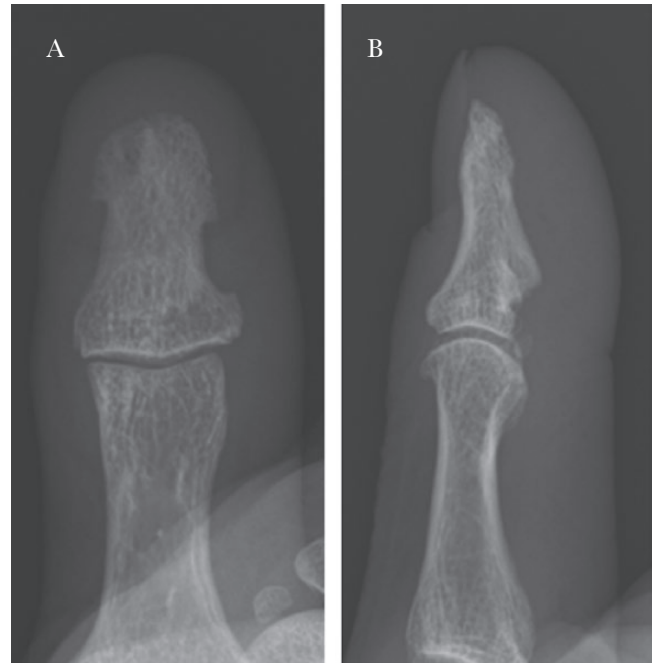


Figure 3. Plain x-ray images of the phalanx of the right thumb 2 years after the surgery. A, Frontal view. B, Lateral view.

DISCUSSION

Osteomyelitis often occurs in long bones and rarely occurs in the bones of the fingers. In addition, osteomyelitis of the finger occurs frequently after trauma or surgery. *Parvimonas micra* and *Fusobacterium nucleatum*, normal flora in the oral cavity, are very rare as the pathogenic bacteria of osteomyelitis except in periodontal disease [1, 2] and there are no previous reports on the occurrence of osteomyelitis due to *P. micra* and *F. nucleatum* in the finger bones.

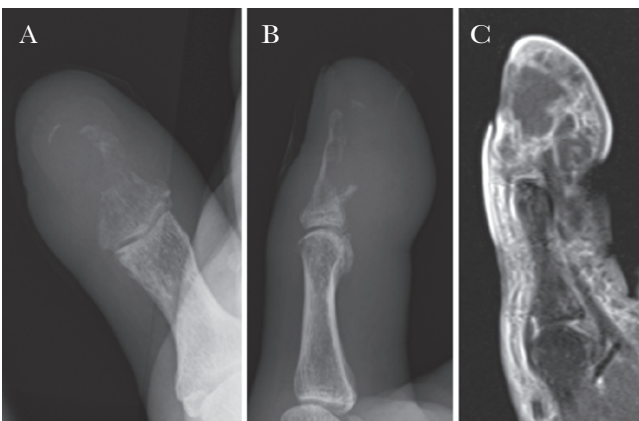


Figure 2. Images of the phalanx of the right thumb on the eighth day after the biopsy. A, Plain x-ray of frontal view. B, Lateral view. C, Sagittal view of enhanced T1-weighted magnetic resonance imaging with fat suppression demonstrated a ring-like contrast and fluid retention.

In the present case, *P. micra* and *F. nucleatum* were detected in the culture of the tissue in the distal phalanx. Both bacteria are part of the normal flora in the oral cavity. Although these bacteria have been reported to be pathogens causing head and neck infections, they rarely cause osteomyelitis. There are few reports on pyogenic spondylitis [3] and septic arthritis of the knee [4]; however, there are no reports on *P. micra* causing osteomyelitis in the fingers. On the other hand, there are several reports on the occurrence of osteomyelitis in the spine [5] and long bones [6]; however, there are no reports on the occurrence of finger osteomyelitis due to *F. nucleatum*. This is the first report on osteomyelitis of the finger bone caused by *P. micra* and *F. nucleatum*, which is probably related to the treatment of dental caries.

The patient had no history of trauma in his finger. However, since he worked in a construction industry, he probably had some microtrauma, which might have led to the infection. At his presentation to our hospital, there was no local heat, redness, or swelling in the thumb; however, the distal phalanx of the thumb exhibited marked osteolysis. If the pathogenic bacteria had infiltrated through the microtrauma, there should first have been some sign of infection on the skin or subcutaneous tissues surrounding the distal phalanx before the osteomyelitis. Therefore, it is considered unlikely that the osteomyelitis of the patient, which showed no skin infection, was caused by microtrauma of the skin.

In conclusion, *P. micra* and *F. nucleatum* are pathogenic bacteria that rarely cause osteomyelitis except for in cases of

periodontal disease, and to the best of our knowledge, there are no previous reports of osteomyelitis due to *P. micra* and *F. nucleatum* occurring in the finger bones. Osteomyelitis is important as a differential diagnosis even if there are few inflammatory findings. Although *P. micra* and *F. nucleatum* are rare pathogenic bacteria of osteomyelitis, a caution including prophylactic administration of antibiotics might be needed during intensive dental treatment such as hemisection.

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Author contributions. K.T. and H.T. conceived the study concept and design. K.T., T.I., M.K., and I.I. performed the study, data collection, and analysis. All authors conducted interpretation of data and drafting and revision of the manuscript.

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