

# A Bite to Remember: A Case Report of Necrotizing Soft-Tissue Infection of the Forearm Caused by *Prevotella intermedia*

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## Learning Point of the Article:

This case highlights the importance of maintaining a high clinical index of suspicion for necrotizing soft-tissue infections after a human bite, as uncommon anaerobes such as *Prevotella intermedia* can rapidly progress to life-threatening infections requiring early surgical intervention.

## Abstract

**Introduction:** Human bite wounds account for a small proportion of bite injuries but carry a high risk of infection due to polymicrobial inoculation. While most infections present as cellulitis or abscess, necrotizing soft-tissue infections (NSTIs) are rare and potentially fatal.

**Case Report:** We present the case of a 72-year-old female who developed an NSTI of the forearm after an occlusal human bite. Despite empiric antibiotics, the infection progressed rapidly, and intraoperative cultures grew *Prevotella intermedia*, an uncommon anaerobe in NSTIs. She required urgent fasciotomy and debridement, followed by targeted antibiotics and wound closure.

**Conclusion:** This case underscores the importance of early surgical consultation for suspicious bite wounds and highlights *P. intermedia* as a potential pathogen in upper extremity NSTIs.

**Keywords:** Human bite, necrotizing soft-tissue infection, *Prevotella intermedia*, hand infection, anaerobic bacteria.

## Introduction

Human bite wounds account for approximately 3% of all bite injuries seen in emergency departments and carry a high risk of infection due to the polymicrobial flora of the oral cavity. Infected human bites commonly involve both aerobic and anaerobic bacteria.

These injuries are typically classified as either occlusal (biting down) or clenched fist (penetrative) bites. In one study of 50 infected human bites, mixed aerobes and anaerobes were isolated from 54% of wounds, aerobes alone from 44%, and anaerobes alone from 2%. Common isolates include *Streptococcus anginosus* (52%), *Staphylococcus aureus* (30%), *Eikenella corrodens* (30%), *Fusobacterium nucleatum* (32%), and

*Prevotella melaninogenica* (22%) [1].

While most infections result in cellulitis or abscess formation, severe but rare complications such as septic arthritis, osteomyelitis, and necrotizing soft tissue infections (NSTIs) can occur. NSTIs are life-threatening, with high morbidity and mortality if not recognized early [2,3]. This case highlights an unusual anaerobic organism, *Prevotella intermedia*, as the causative pathogen in an upper extremity NSTI following a human bite.

## Case Report

A 72-year-old Caucasian female with Alzheimer's dementia, hypertension, hyperlipidemia, and hypothyroidism developed

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## Author's Photo Gallery



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progressive swelling and erythema of the left forearm after being bitten by her adult son. She was initially treated at an outside hospital with empiric antibiotics, but worsened, prompting transfer.

On arrival, she was hemodynamically stable. Laboratory findings revealed leukocytosis (white blood cell count of 13.2 cells/mcL), hypophosphatemia (1.5 mg/dL), and elevated C-reactive protein (34.19 mg/dL). Computed tomography demonstrated extensive subcutaneous gas and fluid extending from the distal humerus to the wrist ( $3.2 \times 10.5$  cm), concerning for NSTI (Fig. 1).

Plastic surgery was performed at the bedside, with incision and drainage in the emergency room. The patient was admitted for intravenous antibiotic therapy, and formal operative debridement occurred on hospital day 2. A dorsal and volar fasciotomy exposed a large abscess cavity; purulent material was present in subcutaneous tissue, though muscle and fascia appeared viable.

Anaerobic cultures grew *P. intermedia*. Antibiotics were escalated to daptomycin and piperacillin–tazobactam, then narrowed to amoxicillin–clavulanate and metronidazole once sensitivities were available. Wound care was managed with dressing changes. No further debridement was required, and delirium precautions helped improve her mental status. On hospital day 7, she underwent delayed wound closure and was discharged home on oral therapy in stable condition.

### Discussion

NSTIs from human bites are rare but aggressive. Although human bites represent only 3% of bite injuries, they are often underestimated because the external wounds may appear minor [4]. Occlusal bites, such as in this case, can transmit large

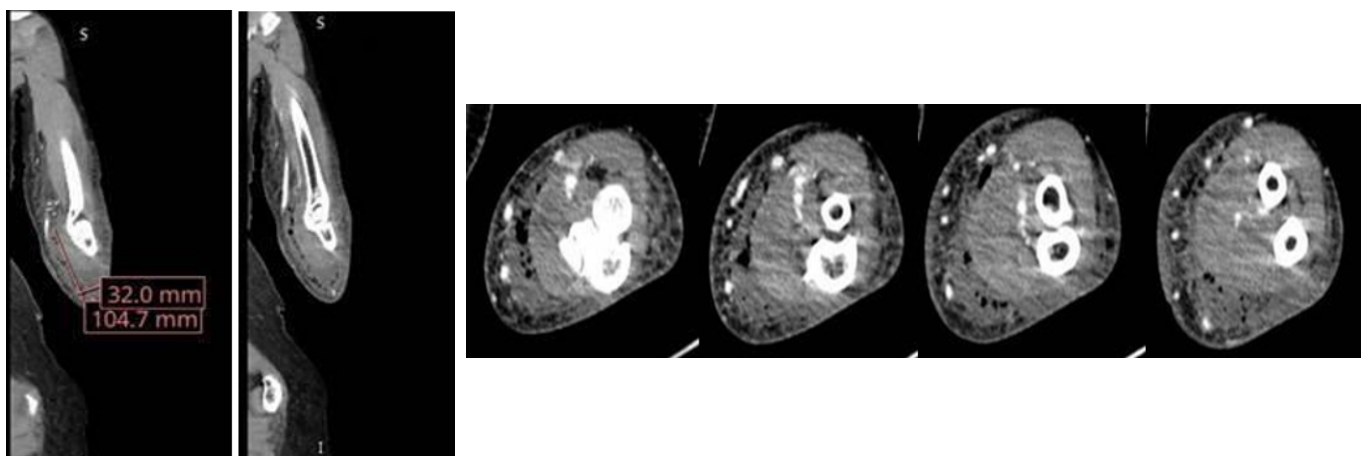
volumes of oral flora directly into deep tissue planes [5].

The oral cavity contains over 50 bacterial species and approximately 108 organisms per milliliter of saliva [5]. Frequently isolated aerobes include *S. anginosus*, *S. aureus*, and *E. corrodens*, whereas anaerobes such as *Prevotella* and *Fusobacterium* dominate the anaerobic spectrum [1, 5]. In one prospective study, mixed aerobes and anaerobes were recovered from over half of infected bites, and many strains produced beta-lactamase, conferring resistance to penicillins [1].

*P. intermedia*, typically associated with periodontal disease, is rarely implicated in NSTIs. *P. intermedia* is part of the normal oral microbiota but can act as an opportunistic pathobiont within dysbiotic biofilms, contributing to inflammatory tissue destruction and invasive infection when host defenses are compromised [6]. It thrives in anaerobic, inflamed environments and exhibits resistance to penicillins, cephalosporins, and tetracyclines [7]. In our case, the isolate was susceptible to metronidazole, ampicillin–sulbactam, piperacillin–tazobactam, and meropenem, consistent with prior reports [7].

The pathogenicity of *P. intermedia* is linked to biofilm formation and secretion of virulence factors that stimulate pro-inflammatory mediators such as interleukin (IL)-1 $\beta$ , IL-8, and matrix metalloproteinases, accelerating soft-tissue degradation [7,8]. Immunocompromised patients, including elderly or diabetic individuals, may be especially prone to NSTIs following bite wounds [7].

Empiric management should therefore include broad coverage for aerobes, anaerobes, and methicillin-resistant *S. aureus*. Infectious Diseases Society of America guidelines recommend vancomycin in combination with piperacillin–tazobactam or a carbapenem, with de-escalation based on culture results [9, 10]. Early surgical consultation is crucial when features such as pain



**Figure 1:** Coronal (a) and axial (b) Computed tomography images of the left forearm demonstrating an extensive subcutaneous fluid collection measuring  $3.2 \times 10.5$  cm and a gas pattern consistent with necrotizing soft-tissue infection. Images progress from proximal to distal.

out of proportion, rapidly advancing erythema, or subcutaneous gas are present [3,5].

Our patient's favorable outcome underscores the importance of timely multidisciplinary management, including urgent surgical exploration, culture-directed antibiotic therapy, and supportive care. While *Prevotella* spp. are uncommon causes of NSTI, they should remain on the differential in bite-associated infections.

### Conclusion

Human bite wounds can progress rapidly to NSTI. Prompt recognition by both surgical and medical teams, broad-

spectrum empiric coverage, and early surgical management are essential. Rare anaerobes such as *P. intermedia* should be considered in refractory or severe cases.

### Clinical Message

Human bite wounds can progress rapidly to necrotizing soft-tissue infection despite an initially benign appearance. Early recognition, prompt surgical evaluation, and broad-spectrum antimicrobial coverage are essential to positively impact mortality following NSTIs. Anaerobic oral flora, including *Prevotella intermedia*, should be considered potential pathogens in bite-associated infections in order to ensure proper coverage with antibiotics.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**Conflict of interest:** Nil **Source of support:** None

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