Eikenella spp *and the Human Fight Bites*

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Human bite wounds account for the third most common type of bite seen by urban physicians. These wounds frequently become infected and the flora of the wound is polymicrobial. Although *Eikenella spp* is an unusually detected pathogen in clinical practice, it can be identified in injuries arising from contact with the oral cavity and thus it is this month's **Bug of the Month**.

Epidemiology

The majority of human bites result from "clenched fist" injuries; however, accidental bites from thumb sucking, sports and sexual activity ("love nips") also arise. Male patients usually present with bite wounds to the upper extremity, including the:

- shoulder,
- arm and
- hand.

Female patients frequently present with bite wounds to the:

- breast,
- genitalia,
- leg and
- arm.

Seventy per cent of the patients who present with human bite infections to emergency departments are men, with a median age of 27 years. The hands are involved in 86% of these bite injuries and are associated with a more serious potential infection. A delay in seeking medical attention may result due to embarrassment of the mechanism or lack of pain with a small bite. In up to 5% of patients, amputation secondary to bite wounds takes place due to initial trauma or the subsequent infection.

What is a fight bite?

A clenched fist injury or a "fight bite" is the most severe of all human bite wounds. The mechanism of this injury results from one person striking the tooth of another while punching that person in the mouth. The wound is commonly a 3 mm to 8 mm puncture or laceration over the metacarpophalangeal (MCP) joint, penetrating the extensor tendons and entering the MCP joint. As the fingers are straightened out from the clenched position, the hole in the extensor tendon moves proximally, effectively sealing the contaminated MCP joint.

Infection may be evidenced by pain, swelling and erythema presenting within 24 hours of the injury. Given the frequency of MCP joint capsule penetration, septic arthritis is common and osteomyelitis is a serious potential complication. As the patient may delay presentation or withhold details of the altercation, a high index of suspicion must be maintained for what may seem like a benign appearance. Frequently, surgical intervention is needed to effectively treat the joint space infection or tenosynovitis.

What do we find in a human bite wound?

Human bite wounds to the hand are potentially serious injuries due to the virulence of the organisms comprising the human oral flora. Over 42 species of bacteria have been recovered from cultures of the human mouth. The majority of bite wounds have an average of five different microorganisms per wound. The aerobic organisms most frequently recovered in bite wounds include the gram positive cocci, α- and β-hemolytic streptococci, *Staphylococcus aureus*, *S. epidermidis* and *Corynebacterium spp*. It is important to note that although *S. epidermidis* is recovered from these wounds, it is seldom the pathogen, but rather a skin commensal. The most commonly observed anaerobic organisms include:

- *Bacteroides fragilis*
- *Prevotella spp*
- *Porphyromonas spp*
- *Peptostreptococcus spp*
- *Fusobacterium spp*
- *Veillonella spp*
- *Clostridium spp*
- *Eikenella corrodens*

What is E. corrodens*?*

This fastidious, gram negative facultative anaerobic bacillus grows in aerobic and anaerobic conditions, but requires an atmosphere enhanced by 3% to 10% carbon dioxide. *Eikenella spp* is oxidase-positive, catalase-negative, urease-negative, indole-negative and reduces nitrate to nitrite. *E. corrodens* exists in 25% of fight bites and is often responsible for serious infections. *E. corrodens* can be treated with the β-lactams, such as the penicillins and cephalosporins, or other agents, such as the tetracyclines.

Clinical manifestations of infection

The most frequent presenting symptom is pain at the site of infection. Patients will also demonstrate swelling and erythema at the infection site. Occasionally, purulent drainage is noted but is often not seen until surgical exploration of the wound is performed. Tender regional adenopathy and lymphangitis may also be observed. It must be remembered that injuries on the volar surface of the fingers or hand will frequently present with dorsal hand swelling. This may be the initial presentation of a volar injury. These infections may initially appear minor, but may evolve to very serious processes with grave consequences.

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Antibiotic therapy

The route and agent for the antibiotic management of bite infections depends upon the extent and severity of the process. Empiric antibiotic therapy must be broad in spectrum since mixed infections are common when caused by human bites. The choices of initial therapy include cefoxitin, combinations with activity against aerobic gram positive cocci, anaerobes and gram negative pathogens, such as ceftriaxone and clindamycin, or single agents, such as piperacillin-tazobactam. If allergy exists to the β-lactams, clindamycin and a fluoroquinolone, such as ciprofloxacin, may be an option. Patients who present early after the bite wound and before evidence of infection may be candidates for prophylactic antibiotic treatment. The first dose of prophylactic therapy should be given parenterally to obtain effective tissue antibiotic levels early. Oral therapy with amoxicillin-clavulanic acid will provide a spectrum of activity that will address all of the pathogens found in the oral cavity and which could cause a bite-related infection.

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Table 1

Approach to human bites of the hand

History
1. Establish hand dominance
2. Time elapsed since injury
3. Mechanism of injury
4. Specific complaints
5. Medical history (immunosuppression by medication or disease, splenectomy, diabetes, arterial insufficiency)
6. Allergies (anesthetics, analgesics, antibiotics)
7. Tetanus status
8. History of previous hand trauma

Examination (regional)
1. Determine depth and location of injury
2. Determine sensory nerve function, prior to any local anesthesia
3. Determine vascular status
4. Establish integrity of tendon function
5. Evaluate underlying joints for involvement

Laboratory
1. Culture wound if infected, both aerobic and anaerobic
2. Plain radiograph to rule out foreign body, fracture and osteomyelitis

Initial treatment
1. Exploration of wound and/or joint space (local anesthesia needed)
2. Debridement of devitalized or crushed tissue
3. Copious irrigation with normal saline with a large syringe and catheter placed in the wound and/or joint space
4. Wound to be left open to heal by secondary intention. Small drain frequently left in the joint space

Bites to the hand are not to be closed primarily
5. Elevation and immobilization in a position of function
6. Tetanus toxoid if necessary
7. Therapeutic antibiotics if there are signs of infection
8. Prophylactic antibiotics if no signs of infection
9. Patient may require hospital admission (septic arthritis or tenosynovitis)
10. Hand therapy to be initiated within 48 to 72 hours