

Emergency Department Approach to Electrical Toothbrush Associated Hand Injury, a Unique Case of Non-Oropharyngeal Injury

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INTRODUCTION

- Puncture wounds are injuries that result from penetration of an object through the skin [1]
- Emergency department (ED) providers must
 - Be aware of the danger associated with bacterial contamination of a wound
 - Be familiar with possible causal pathogens and options for treatment
- Puncture wounds are frequently caused by human or animal bites
 - Associated with bacteria uncommonly found in wounds from other causes
- We present a case of a hand puncture by electric toothbrush
 - No reported management of non-intraoral injury directly related to an electrical toothbrush in the literature

CASE REPORT

A 30-year-old male presented to the ED with a puncture wound on his left hand from the metal post of an electric toothbrush. He denied weakness, paresthesia or any systemic symptoms. His tetanus vaccination was up-to-date. Upon physical exam, the skin of the left hand was warm, moist, and pink. A puncture wound that extended to the subcutaneous tissue was visualized on the palm. (Fig. 1) Swelling was observed on the dorsal aspect of the hand. No tendon deficit was observed, but the patient experienced difficulty extending his second and third digits due to associated pain. A sterile field was established, and the skin was prepped with betadine and chlorhexidine. Copious irrigation was performed with 800 mL of normal saline using pressure cap. Hand X-ray revealed positive air in the tissue from a laceration/puncture source. The patient's hand was bandaged and splinted. He was prescribed amoxicillin/clavulanate, one tablet of 875 mg–125 mg 2x/d, and pain medication. One day after injury, the patient reported no worsening of symptoms. He had normal ROM, strength, and sensation without swelling. There was no change in the degree of redness from the previous day. There was, however, a decreased ability to flex the left index finger due to pain.



Figure 1. Left hand with puncture wound

DISCUSSION

- Increased popularity of electric toothbrushes over non-electric toothbrushes due to their increased effectiveness [2]
- Electric toothbrushes pose unique risks for injuries due to their design
 - 2012: US FDA received reports that parts of electric toothbrushes could break off during use [3]
 - Brush head popped off the base, allowing the metal piece underneath the head to injure cheeks and other areas of the face near the eyes [3]
- Treatment of puncture wounds
 - Within 6 h of injury: debridement and irrigation with saline solution [4]
 - After 6 h from injury: incision and drainage, if necessary [4]
 - Signs of infection or foreign bodies: surgical debridement [4]
 - Primary closure is often contraindicated, but this principle is controversial [4]
- Antibiotics indicated for patients who
 - Have delayed presentation [4]
 - Are at high risk of infection [4]
 - Have wounds that are highly contaminated [4]
- Superficial wounds within two days of injury may be treated with a first-generation cephalosporin [4]
- Significant wounds should be immediately treated empirically and later adjusted to reflect the results of culture and susceptibility tests [5] (Table 1)
- Broad spectrum coverage should be administered in patients with grossly contaminated wounds and in those who are at risk for infection (i.e. immunocompromised, diabetics) [4]

Table 1. Oral treatment options for bacteria commonly found in hand puncture wounds

Bacteria	Oral treatment options [6, 7, 8]
Methicillin-sensitive <i>Staphylococcus aureus</i>	Cephalexin 500 mg PO 4x/d; dicloxacillin 500 mg PO 4x/d; clindamycin 400-450 mg PO 3x/d; doxycycline 100 mg PO 2x/d; amoxicillin/clavulanate 875 mg PO 2x/d
Methicillin-resistant <i>Staphylococcus aureus</i>	Clindamycin 300-450 mg PO 3x/d; TMP/SMX 1-2 DS tabs PO 2x/d; doxycycline 100 mg PO 2x/d; minocycline 100 mg PO 2x/d; linezolid 600 mg PO 2x/d
<i>Streptococcus pyogenes</i> , <i>Streptococcus agalactiae</i>	Dicloxacillin 500 mg PO 4x/d; cephalexin 250 mg-1 g 2-4x/d
<i>Streptococcus pneumoniae</i> , viridans streptococci	Amoxicillin/clavulanate 875 mg 2x/d or 250-500 mg 3x/d
<i>Pasteurella multocida</i>	Amoxicillin 250-500 mg 3x/d or 500-875 mg 2x/d; doxycycline 100 mg 2x/d
Pneumococcus	Amoxicillin/clavulanate 875 mg 2x/d or 250-500 mg 3x/d; levofloxacin 250-750 mg 2x/d; moxifloxacin 400 mg 1x/d

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