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A percutaneous injury by a contaminated instrument is a human bite equivalent

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Background. Percutaneous exposure incidents represent an important occupational health issue.
Case report. A paediatric dentist was cut by a small round bur in a handpiece. A few hours later the elbow became swollen and painful. Since the bur had been contaminated with saliva and oral flora, the injury was treated as a human bite equivalent. An X-ray revealed the broken piece of the bur in the soft tissue of the dentist's elbow.
Conclusion. Care should be taken to prevent and treat injuries by sharp items, during and also following dental treatment.

Introduction

Percutaneous exposure incidents represent an important occupational health issue, and one that can incur severe consequences from blood-borne infections. A retrospective review of 8.5 years of data from the National Surveillance System for Health Care Workers (NaSH) reported that 367 of 18,584 percutaneous injuries of all healthcare personnel involved dental personnel. Relevant to the current report, 36% of the injuries were reported by dentists, compared with 34, 22, 4, and 4% by oral surgeons, dental assistants, students, and hygienists, respectively. Burs accounted for 10% of the injuries, with half occurring during, and half following, instrument use. In 9% of the cases the injury resulted, as in our case, from collision with a sharp object[1]. Of 285 dentists responding to a questionnaire in Australia, 27.7% reported experiencing at least one 'sharps' or needlestick injury in the previous 12 month, 16.1% of which involved a contaminated instrument that had been previously used on a patient. As in the NaSH study, burs caused 10% of the injuries[2].

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Case report

While sitting at 8-o'clock position and performing fissure sealants in tooth #36 (lower left first permanent molar) of a 6-year-old boy, a paediatric dentist was cut in her right elbow by a small round bur in a low-speed handpiece located behind her (it had been used for mechanical preparation of the fissures earlier). The bleeding was stopped with alcohol soaked gauze. The dentist noticed that the bur was broken but did not look for the missing piece. Rather, she continued treating the patient and the patients after him. A few hours later the elbow became swollen and painful. At a medical emergency center the injury was treated as a human bite equivalent since the bur had been contaminated with saliva and oral flora. The orthopaedist prescribed Augmentin, 875 mg twice daily for 7 days. An anti-tetanus vaccination was not administered since the dentist had received one in the last 3 years. Baseline serologic blood tests for human immunodeficiency virus (HIV), HBV, and HCV were taken on the same day, and from the boy 3 days later. The dentist should repeat these tests after 3 months[3]. Since the bur was broken, and the broken piece not found, an X-ray was taken. The bur was revealed in the soft tissue of the right elbow (Fig. 1). After administration of local anaesthesia, an orthopedist removed the bur from the soft tissue (Fig. 2), and bandaged the wound.

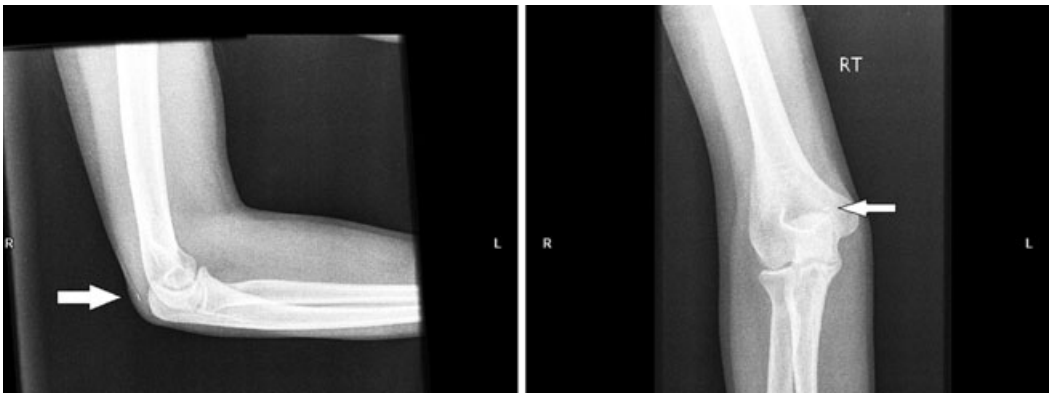

Fig. 1. The bur is indicated by an arrow in lateral and anterior-posterior X-ray views.

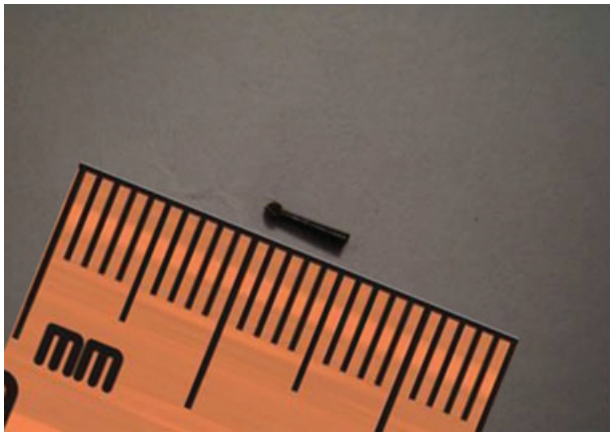

Fig. 2. The broken piece after it was removed from the soft tissue.

Antibiotic treatment was started on the same day. The dentist had already been vaccinated against tetanus and HBV. The prognosis for this case was good; the baseline blood tests of the boy and the dentist were negative for infection of HIV, HBV, and HCV.

Discussion

While percutaneous injuries may occur commonly to dental personnel, to the best of our knowledge, no similar case report has been documented. Caused by a contaminated dental instrument, the occupational accident described was equivalent to a human bite. Human bites result in local infections, and pose risks for systemic disease. The concentration of as many as 50 species of bacteria in human saliva, at a density of 10^8 microbes per mL, explains the high rate of infection due to human bites compared with other injuries. Moreover, injuries approximate to joints are particularly prone to infection since joints are relatively avascular, and thus with limited capability of fighting infection. Rates of infection from bite wounds are lower when inflicted by children than by adults, apparently due to decreased tooth disease or a lower incidence of gingivitis[4].

Antibiotics are indicated for the prophylaxis and treatment of infected human bites. The most common aerobic species isolated from bite wounds are *Streptococcus*, *Staphylococcus*, and *Eikenella*; *Streptococcus anginosus* contaminates 52%. The most common anaerobic pathogens are *Prevotella* and *Fusobacterium* species[5]. Transmission of HIV via a human bite is unlikely, yet anecdotal reports do exist. Though HIV may be present in the saliva (infrequently and at low levels), exposure to saliva alone is not considered a risk factor for viral transmission. In most cases, salivary inhibitors render the virus noninfective. Therefore, the risk of HIV transmission presents mainly when there is blood in the mouth of the person who bites[4]. Isolated cases of transmission of viral hepatitis, herpes virus, tetanus, Actinomyces, and *Treponema pallidum* through human bites have been reported in the literature[4]. Therefore, administration of tetanus immunoglobulin and tetanus toxoid to patients with a history of two or fewer immunizations is recommended.

According to the Center for Disease Control and Prevention Guidelines for Infection Control in Dental Health, sharp items such as needles, scalers, burs, lab knives, and wires that are contaminated with patient blood and

saliva should be considered as potentially infective, and work practices to prevent injuries should be established[6]. Better training and awareness, care during procedures and handling instruments, avoiding hazardous practices, development of safer techniques, and immediate and appropriate treatment, may prevent infection and diseases. Relevant to this particular case, we recommend that all burs be removed from handpieces, or covered with plastic cups or cotton rolls immediately after their use, to avoid cuts. Wounds and skin sites that have been in contact with blood or body fluids should be washed with soap and water; mucous membranes should be flushed with water. The use of antiseptics is not contraindicated. In case of a broken bur, it is important to look for the broken piece, and take an X-ray of the injured area if it is not found, to rule out its presence in the tissue.

What this paper adds

- This case highlights the importance of treating injuries by contaminated dental instruments as human bite equivalents.
- Broken pieces of instruments that have caused percutaneous injury should be looked for, even if it means X-raying the injured area.

Why this paper is important to paediatric dentists

- Injuries by sharp instruments can easily occur in dental clinics.
- Appropriate safety measures can reduce occurrence; appropriate treatment can prevent infection.

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