

IN BRIEF

- Foreign bodies such as bullets can remain silent for a long period of time without giving rise to clinical symptoms.
- It is important for the dentist to consider removal of a foreign body/bullet only if there is a serious health hazard, keeping in mind the possibility of causing a pathologic fracture.
- As age advances, a periodic assessment of blood lead level is advised due to various metabolic changes which may occur and which might lead to mobilisation of the lead from its stores.

Bullets in the mandible over 12 years: a case report

F. A. Fernandes¹ and A. Fernandes²

Foreign bodies that enter a patient as a result of trauma are contaminated and produce a range of symptoms. We report a case in which radiographic evidence of foreign bodies in the mandible exposed a history involving a gunshot injury to the chin. The patient did not have any major complaints relating to the bullets lodged in his mandible or any symptoms of lead poisoning. These foreign bodies have remained clinically silent for more than 12 years.

INTRODUCTION

Traumatic injuries often drive foreign objects into the human body. Commonly, foreign bodies are glass, wood, thorns, plastic and metal. A foreign object in the body causes infection¹ and toxicity.² Some foreign objects remain isolated by encapsulating themselves with a granulation tissue reaction and pose very little danger.^{2,3} Foreign bodies like teeth, dental instruments, burs, glass, wood, dental materials and a solitary bullet have been found in the oral and maxillofacial area.¹ Given that the presence of a foreign body like a bullet would cause infection and poisoning, this is an unusual case in which the foreign objects have remained asymptomatic for more than a decade.

¹Resident, Goa Dental College & Hospital, Bambolim-Goa, India; ²Assistant Professor, Department of Prosthodontics, Goa Dental College & Hospital, Bambolim-Goa, India

*Correspondence to: Dr Fara A. Fernandes, Rector's Quarters, Govt. Polytechnic Campus, Altinho, Panjim-Goa, India
Email: sansrival78@hotmail.com

Refereed Paper

Accepted 3 August 2006
DOI: 10.1038/bdj.2007.273

©British Dental Journal 2007; 202: 399-401

CASE REPORT

A 50-year-old male patient presented to the Department of Prosthodontics this year for replacement of ill-fitting dentures. The patient had a history of a single gunshot injury to the face around 12 years earlier. He mentioned that he was shot from close range with a home made gun, which from the description sounded like a Muzzleloader. Recalling events at the time of the injury, he said that the spherical pellets caused damage to the soft tissue and fracture to the jawbone with avulsion of a few teeth. He could not, however, elaborate on the management procedures, but said that the attending doctor had removed some of the bullets and the rest of the teeth affected by periodontal disease. He was advised at that time to undergo regular evaluation to keep a check on any toxic effects. After an uneventful healing, a set of complete dentures was made, which he had not had replaced until now, even though they were causing him mild discomfort from the time they were first fitted. He did not report for regular evaluation either.

The gunshot had left a scar to the mental region approximately 2 cm x 1 cm in dimension. A firm nodular

greyish mass 0.5 x 0.5 cm was palpable in the left buccal soft tissue along with a hard mass palpable at the floor of the mouth. There was no loss of sensation over the facial skin. Intraorally, a palpable depressed alveolar ridge in the mandibular anterior region (Fig. 1) with an elongated bony extension on the lingual aspect was present. An object, firm in consistency, in the left retromylohyoid region was found to be responsible for the discomfort.

Radiographic investigation carried out revealed multiple dense scattered radiopacities about a resorbed mandible and the surrounding soft tissue (Fig. 2). The divergent spread of the bullets was seen on a lateral oblique radiograph (Fig. 3). A concentration of these radiopacities and an enlarged and elongated genial tubercle was evident in the mental area on a mandibular true occlusal (Fig. 4).

In order to evaluate the patient further, a complete haemogram, histopathological investigation and metal analysis was carried out. The haemogram showed no tell-tale signs of an ensuing plumbism in the body. Tissue surrounding the bullet subjected to histopathology showed the presence of chronic non-specific inflammation with hyperplasia of the lining



Fig. 1 Intraoral photograph showing a depression in the mandibular alveolar ridge

epithelium. Metal analysis concluded that the bullet mainly consisted of lead (Table 1).

As the bullet was largely made up of lead, blood obtained by venipuncture was tested. Whole blood lead level was found to be 13.7 µg/dL (normal 7-10 µg/dL).

With surgical intervention, three bullets from the left retromylohyoid area and one bullet from the right ramal area along with surrounding soft tissue were removed (Fig. 5). Prosthetic rehabilitation was initiated after satisfactory healing. Extension of the denture into the retromylohyoid area was necessary to provide adequate retention. The patient had requested the removal of the bony extension, but this was not attempted due to the risk of causing a pathologic fracture. The patient was advised to follow a diet consisting of iron, calcium and vitamin C-rich foods and have regular dental check ups.

DISCUSSION

From the patient's history, it can be deduced that the weapon used must have had a very low wounding capacity. The muzzleloader, a home-made gun, may be considered to be the most primitive kind of firearm. It carries pellets (charge) detonated by gunpowder in a ratio enough for its propulsion out of the weapon (Fig. 6a) and to strike the target at high velocity causing serious damage. This

Table 1 Constituents of the foreign body	
Metal	Amount
Lead (Pb)	39.9 mg/g
Cadmium (Cd)	1.8 µg/g
Manganese (Mn)	1.2 µg/g

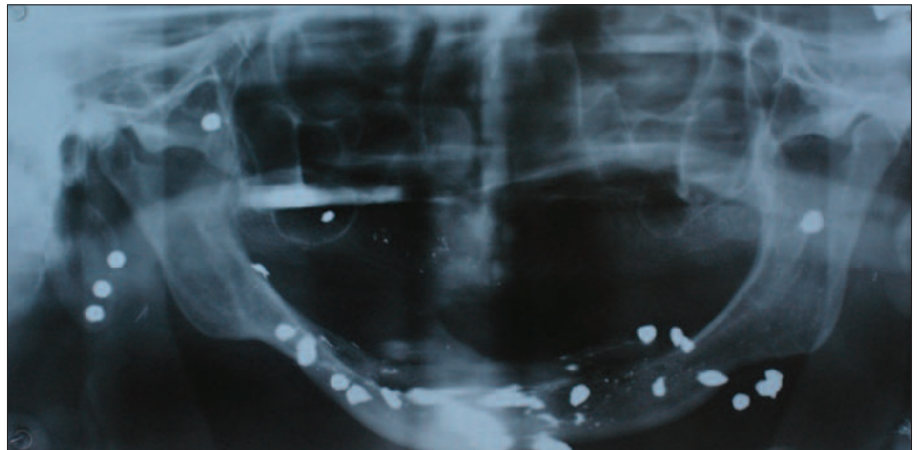


Fig. 2 Orthopantomograph showing a large number of radiopacities scattered over the entire mandibular area

high velocity shot from such a weapon at close range would thus be fatal,^{4,5} but such circumstances were not seen in our patient. Hence, we assume that the charge-gunpowder proportion must have been so high (Fig. 6b) that the explosion of the small amount of gunpowder did not allow the pellets to gain sufficient velocity to overcome the resistance of the subcutaneous tissues,⁴ resulting in a cone like spread of bullets with a heavy concentration of them in the mental area with no evidence of a fatal exit wound - causing them to remain lodged in the maxillofacial area.

At the time of attending to an injury in an emergency situation, medical workers tend to remove visible foreign bodies and other debris, mainly focusing on stabilising the patient, their fractured bones, damage to soft tissue, vascular structures, nerves and accompanying facial disfigurement. This must have been the situation in our patient. Retained lead bullets form a huge concern, as they may give rise to infection⁵ and toxicity.² Patients with retained lead sharpnels developing lead toxicity have been reported as early as the eighteenth century.³ Significant elevated blood lead levels in patients with radiographic evidence of harbouring lead objects was reported by Farrell *et al.* in 1999.³ Adults with blood lead levels exceeding 80 µg/dL present with myriad symptoms of plumbism including abdominal pain, headache, irritability, joint pain, fatigue, anaemia and peripheral motor neuropathy.⁶ In our patient, the approximate amount of lead in the orofacial region would weigh approximately 7 g. On average, a similar concentration of lead would show elevated blood lead

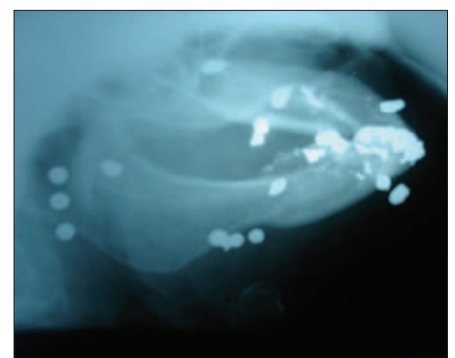


Fig. 3 Lateral oblique radiograph showing a cone shaped spread of the radiopacities

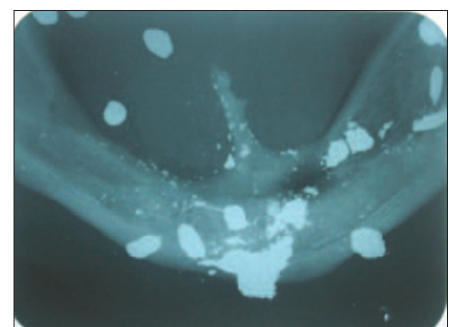


Fig. 4 Mandibular true occlusal radiograph showing a heavy concentration of radiopacities in the mental area along with the image of an enlarged genial tubercle

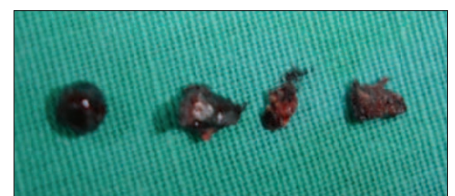


Fig. 5 Four of the bullets after removal

levels in a span of days to a few years.³ Our case is unusual because of the fact that even though there was a heavy concentration of lead bullets, they did not give rise to infection nor did they cause a significant rise in whole blood lead

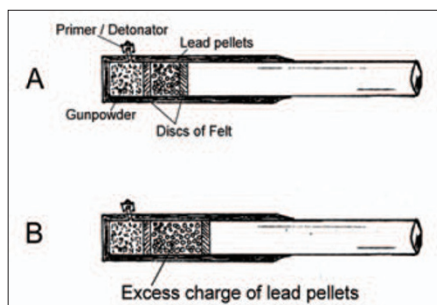


Fig. 6a-b Schematic diagram of the barrel of a Muzzleloader

level for 12 years! This silent presence could be due to three reasons. The primary reason is a poor vascularisation of the area of impaction of the bullets as objects embedded in bone and soft tissue are generally encased with a fibrotic capsule, avoiding the dissolution of lead into blood circulation^{2,3} (though often, lead lodged in bone can be mobilised and introduced into the blood circulation in conditions like re-injury, hypermetabolic states, prolonged immobilisation and chronic alcoholism).^{2,3} The second reason is that an administration of antibiotics post-traumatically probably

controlled the infection; and thirdly, an immunity which must have kept the infection in check.

The elongated bony extension seen on the radiograph could either be a bony fragment displaced into the floor of the mouth or an extensive calcification of the genial tubercle. Considering the age of the patient, the amount of bone resorption, the ominous concentration of lead bullets in that area and the fact that this bony extension aided in providing a large denture bearing area, it was decided not to remove the lead source for the high chances of causing a pathological fracture. The bony extension thus was responsible for reinforcing the mandible on either side of the mental area.

Management of such an asymptomatic patient includes periodic follow-up with measurement of whole blood lead level. The patient must be advised to have a diet rich in vitamin C, calcium and iron as these decrease absorption of lead.⁶ If the lead level rises to almost toxic levels, then administration of chelating agents with removal of the source of lead is recommended.⁶

CONCLUSION

Much attention needs to be drawn towards the presence of retained lead bullets in the body. Foreign bodies embedded in tissues do not necessarily result in clinical presentation. The case presented here is a representation of such a case. Thus, it is important for the dental surgeon to realise that removal of the foreign body may be considered only if there is discomfort, infection or uncontrolled toxicity.

The authors sincerely thank Dr Sushila Fonseca for carrying out the pathological investigations.

1. Abe K, Beppu K, Shinohara M *et al*. An iatrogenic foreign body (dental bur) in the maxillary antrum: a report of two cases. *Br Dent J* 1992; **173**: 63-65.
2. de Madureira P R, De Capitani E M, Vieira R J. Lead poisoning after gunshot wound. *Sao Paulo Med J* 2000; **118**: 78-80.
3. Farrell S E, Vandevander P, Schoffstall J M *et al*. Blood lead levels in emergency department patients with retained lead bullets and shrapnel. *Acad Emerg Med* 1999; **6**: 208-212.
4. Wilson A J. Gunshot injuries: what does a radiologist need to know? *RadioGraphics* 1999; **19**: 1358-1368.
5. Bahador A. Chest injury in close-range shot by Muzzle Loader gun: report of two cases. *Iran J Med Sci* 2000; **25**: 153-155.
6. Habal R. Lead toxicity. www.emedicine.com.