

# Double Beveling on Imaging: A Characteristic Feature of Entry and Exit Penetrating Injury Wound

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## Abstract

### Keywords

- ▶ craniofacial injury
- ▶ penetrating craniofacial injury
- ▶ beveling

Beveling of the calvarial bone is reported in firearm exit wounds and stabbing injuries in forensic literature. Beveling in entry wounds is rare. We report a case of a 27-year-old man who sustained a nonfatal penetrating craniofacial injury due to motorbike brake handle, and completely recovered after conservative management. We describe the characteristic inward as well outward beveling on imaging due the penetrating trajectory of the motorbike break handle.

## Introduction

Atypical cranial vault lesions are characteristically described in forensic literature as sustained due to firearm injuries.<sup>1–3</sup> Beveling of the calvarial bone usually occurs in firearm exit wounds and stabbing injuries.<sup>1,3,4</sup> Rarely beveling is described in firearm entry wounds<sup>1,3,4</sup> and penetrating entry/exit wounds due to a sharp object.<sup>2</sup> We report a case of a nonfatal penetrating craniofacial injury due to motorbike brake handle, managed conservatively, and discuss the characteristic imaging findings of beveling on computed tomography (CT) scan.

## Case Report

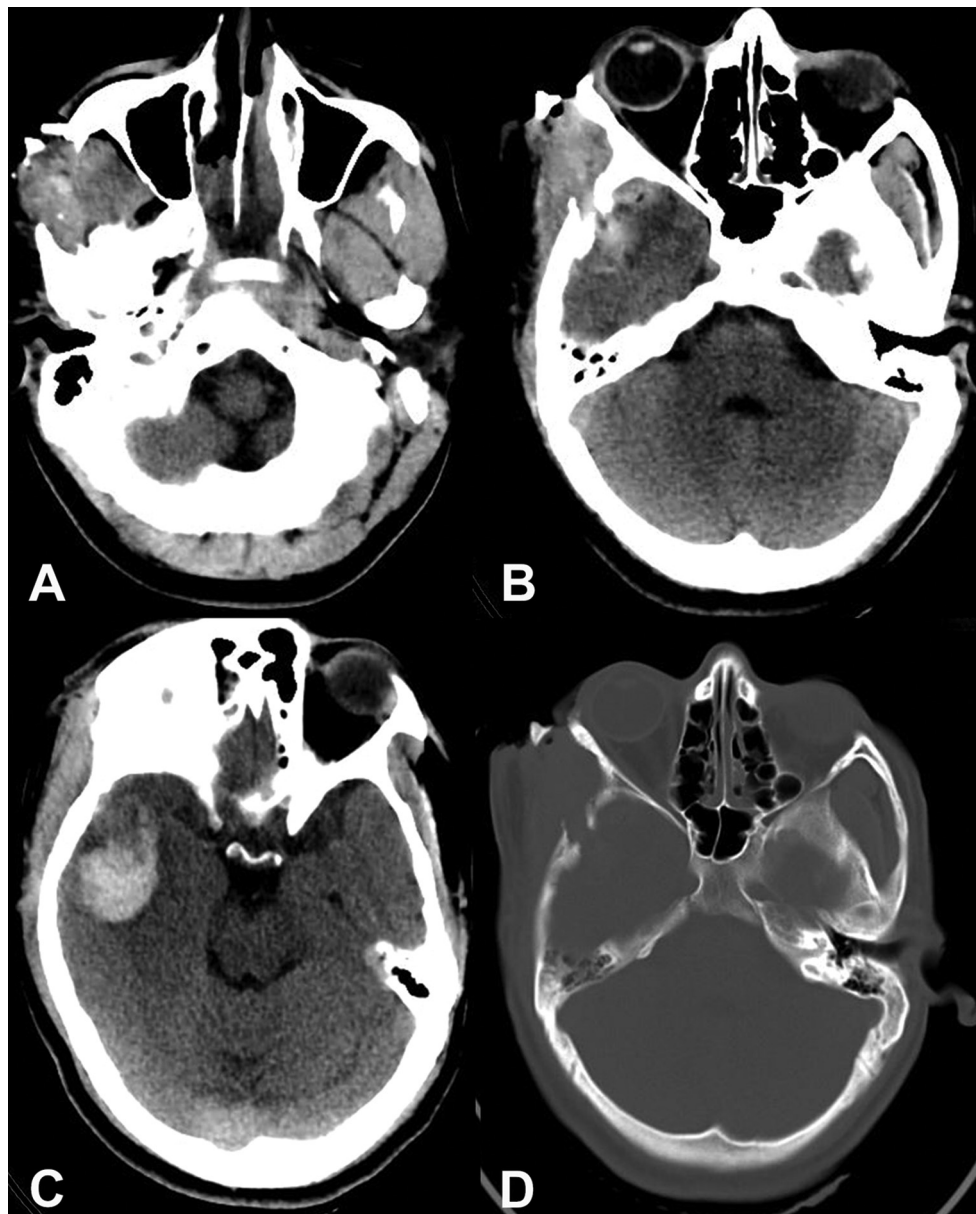
A 27-year-old man was brought to the emergency department with an alleged history of road traffic accident while he was driving a motorbike and collided into the rear side of a lorry, and sustained penetrating injuries to the face as the motorbike handle hit his face. He was unconscious since the time of the accident and had multiple episodes of vomiting. There was no history of seizures and ear or nasal bleed. His general and systemic examination was normal. His Glasgow coma scale (GCS) score was 3 (E1V1M1) and his pupils were bilateral, equal and reacting. In view of poor GCS score he was intubated and kept on mechanical ventilation. Local examination showed a large laceration over the left malar region with visible fracture of the

underlying bone. His blood investigations were normal. An urgent CT scan of the brain and face with bone window showed a small right basitemporal extradural hematoma with specks of pneumocephalus and small right temporal intracerebral hematoma (▶Fig. 1A–C). There was no mass effect due to hematoma. Bone window showed fracture of the zygomatic bone and fracture of the right temporal bone with inward as well outward beveling (▶Fig. 1D). The wound was thoroughly cleaned and sutured. In view of the small size of the hematoma, deep location, and no evidence of mass effect, it was decided to treat conservatively. The patient was continued with mechanical ventilation, antibiotics, antiepileptics, and antiedema measures. The patient responded well to conservative management and a follow-up CT scan suggested resolution in the size of hematoma. The patient made complete recovery and was doing well at follow-up.

## Discussion

Penetrating craniofacial injuries are rare and account for approximately 0.4% of head injuries.<sup>5–9</sup> A wide variety of mechanisms and objects can cause these penetrating craniofacial injuries.<sup>10–14</sup> Apart from the injuries to facial skeleton, penetrating craniofacial injuries can lead to damage to orbit and its contents, cerebrospinal fluid (CSF) leak and its sequel (risk of meningitis or abscess), intracranial hematomas, injury to neurovascular structures, and retained foreign bodies.<sup>11,12,15–22</sup>





**Fig. 1** Computed tomography scan with bone window showing (A) fracture of zygomatic arch, (B) a small right basitemporal extradural hematoma with specks of pneumocephalus, (C) small right temporal intracerebral hematoma, and (D) fracture of the zygomatic bone and fracture of the right temporal bone with inward as well outward beveling fracture margins.

CT scan of the brain and face is the initial investigation of choice as it will provide the details of injuries, presence of intracranial injuries, trajectory of the penetrating object, and the presence of any retained foreign bodies.<sup>21,23,24</sup> If necessary, a CT angiography can be useful to investigate the integrity of cerebral vasculature.<sup>24</sup> The objectives of management of penetrating craniofacial injuries are safe and complete removal of penetrating objects, removal of any necrotic debris, repair of cranial defect to avoid CSF leak and its complications, evacuation of significant intracranial mass hematomas, and repair of vascular damage.<sup>10,21,25-28</sup> The outcome of craniofacial penetrating injuries depends on the mechanism of injury and the underlying damage to neurovascular structures.<sup>10,17,22,24</sup>

If there is no major damage to these structures, the patients with penetrating craniofacial trauma have favorable outcome.<sup>10,17,22</sup>

### Conclusion

Penetrating craniofacial injuries warrant a careful clinical and imaging evaluation of the wound and object trajectory. Characteristic on imaging are important to understand the type and trajectory of penetrating objects. Deep-seated lesions with smaller intracranial hematoma can be managed conservatively but need careful clinical and imaging follow-up.

**Conflict of Interest**

None declared.

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