

# Canine tooth syndrome due to orbital roof fracture

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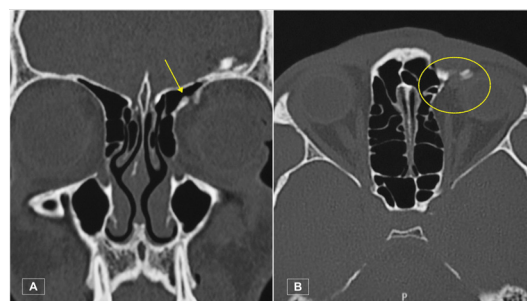
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## DESCRIPTION

A young male presented to our clinic with complaints of binocular vertical double vision from 1 month. His complaints started following alleged motor vehicle accident with injury to the left side of the head. External examination showed a scar over the left forehead above the left eyebrow. His uncorrected visual acuity was 20/20, N6 in both eyes (BE), and colour vision was normal. Rest of the anterior segment examination was normal in BE.

Motor examination showed right head tilt of 10° (figure 1A). Hirschberg corneal reflex testing showed 5° of left hypertropia (LHT). Prism alternate cover testing for distance showed 6 prism diopters (PD) LHT with 5 PD exotropia (XT) in primary gaze. While XT was stable in all gazes, his LHT increased in the right gaze and on left head tilt to 9 PD. In the downgaze, his LHT increased to 14 PD. On extraocular motility testing, his ocular movements were full and free in the right eye (RE). However, the left eye (LE) showed –1 limitation of depression in adduction (dextrodepression). Additionally, he had –1 limitation of elevation which increased to –2 limitation of elevation in adduction (figure 1B). Fundus examination was normal in BE except for mild excyclotorsion in LE.

Based on the clinical findings, LHT worse in the right gaze and left head tilt, we diagnosed our patient to have superior oblique (SO) palsy (SOP) in the LE. However, our patient also had limitation of elevation, which was increasing in adduction, suggestive of associated Brown syndrome. We obtained CT scan of the orbit and brain which showed fracture of the medial wall extending to the medial part of the roof with injury to the trochlea and incarceration of SO at the site of the orbital fracture (figure 2A,B), leading to associated Brown syndrome-like presentation in our patient. We discussed the possible management options with oculoplastic colleagues, who advised exploration and reposition of the entrapped muscle. However, due



**Figure 2** CT scan of the orbit on the coronal view shows the orbital roof fracture at the site of trochlea (A). On the axial view, CT scan shows entrapment of superior oblique muscle at the site of fracture (B).

to associated fracture of the anterior cranial fossa and a high risk of cerebrospinal fluid leak, the surgery was planned in coordination with neurosurgery department. However, the patient decided against surgery.

Our patient posed a diagnostic challenge and had features of both SOP and paradoxical limitation of elevation in adduction in the same eye which is classified as class 7 SOP according to Knapp's classification.<sup>1</sup> They described five cases of class 7 SOP (of which two had been associated with dog bite). Therefore, this entity is also termed as canine tooth syndrome. Other causes reported in the literature are due to surgical trauma to the trochlear region,<sup>2</sup> myocysticercosis of the SO<sup>3</sup> and following closed head trauma.<sup>4</sup> Adulkar *et al*<sup>5</sup> reported a case of orbital roof fracture with SO entrapment at the site of fracture, where it resulted in acquired Brown syndrome-like presentation, but it did not have concomitant SO palsy. Therefore, our case would represent unique presentation of orbital roof fracture resulting in both SO palsy and acquired Brown syndrome.

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**Contributors** All authors contributed to the data collection, manuscript writing and final manuscript revision. VS conceptualised the idea.



**Figure 1** Clinical photograph of the patient showing right head tilt and a depressed scar on the superior orbital rim at the site of the orbital fracture (yellow arrow). (A) In the primary gaze, the patient had left hypertropia of 7 prism diopters (PD) and 5 PD left exotropia. There is –1/2 limitation of depression which was worse in dextrodepression (black asterisk). (B) Further he had –1 limitation of elevation in primary gaze which increased to –2 limitation of elevation in adduction (small black arrow).

## Learning points

- ▶ Fracture at the site of trochlea can cause both direct damage to the muscle and superior oblique (SO) palsy.
- ▶ Further entrapment of SO muscle at the fracture site can result in limitation of elevation in adduction, causing associated Brown syndrome and canine tooth-like syndrome.



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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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