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## LETTER TO THE EDITOR

### Raccoon sign



Dr. Editor,

Raccoon eyes is a clinical sign characterised by the presence of uni- or bilateral periorbital ecchymosis that manifests 2–3 days after head trauma, which is associated with basilar skull fracture. Periorbital ecchymosis does not typically affect the superior tarsus, as the orbital septum hinders blood extravasation.<sup>1,2</sup> Uni- or bilateral presence of this sign may present a positive-predictive value for basilar skull fracture between 70% and 90%, particularly when the fracture is located frontally.<sup>2,3</sup> In contrast to this sign, the periorbital haematoma colloquially known as black eye would be described as the uni- or bilateral periorbital ecchymosis that frequently manifests in the first 24 h after a facial trauma, which may affect the whole eyelid, and is not associated with basilar skull fracture.

We report the case of a patient with raccoon sign and discuss multiple aetiologies that may be associated with this sign.

Our patient is a 55-year-old man with no relevant medical history who suffered an accidental fall leading to posterior head trauma. He did not lose consciousness. The patient reported mild occipital headache with oppressive pain in the injured area and haematoma at the vertex, and non-specific, non-vertigo dizziness. He attended the emergency department 2 days after the accident due to increased headache intensity, sleepiness, and bilateral periorbital haematomas.

During the examination, the patient showed somnolence but it was easy to keep him focused. He was oriented to time, space, and person. Glasgow Coma Scale score was 15/15. The patient presented no neck rigidity and preserved conjugate eye movement. He presented a haematoma in the posterior medial frontal region, as well as bilateral palpebral haematomas, sparing the pretarsal area (Fig. 1). We also observed abrasion in the medial posterior parietal area. The patient displayed no otorrhoea or nasal secretion. He did not present haemotympanum or retroauricular haematoma. No

other relevant pathological findings were observed in the neurological examination.

A cranial CT scan showed haemorrhagic contusions in the bilateral frontal basal region, with an associated small sub-arachnoid haemorrhagic component, and medial frontal fracture, with no pneumocephalus or paranasal sinus occupation.

A series of clinical signs may lead physicians to suspect basilar skull fractures, such as CSF rhinorrhoea, CSF otorrhoea, retroauricular ecchymosis (also known as Battle sign, which is particularly associated with fracture of the temporal bone), haemotympanum, and periorbital ecchymosis (raccoon sign), the finding observed in our patient.<sup>1</sup> This fact is especially relevant as neuroimaging studies do not always show such fractures; thus, clinical findings are more informative than complementary tests.

In these cases, examination is essential for diagnosis and, consequently, for appropriate management, as specific treatment may be needed for some diseases associated with basilar skull fractures, such as CSF fistula, carotid-cavernous fistula, brain abscesses, or meningitis.<sup>1</sup>

The term “raccoon sign” should be limited to cases of periorbital ecchymosis, sparing the palpebral tarsus, due to fractures to the base of the skull. Bilateral palpebral haematomas caused by direct trauma to the orbital and facial region, or non-traumatic medical conditions, may extend beyond the tarsus. Differential diagnosis includes both trivial, benign conditions, and severe conditions, with neuroblastoma, multiple myeloma, and amyloidosis being the most frequent (Table 1).

In conclusion, the raccoon sign is easy to identify in the physical examination. Its presence after head trauma is strongly associated with a fracture at the skull base. The presence of palpebral ecchymosis in the absence of a previous head trauma may serve as a warning sign for other possible diagnoses.

### Declaration of competing interest

The authors have no conflicts of interest to declare.

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**Fig. 1** Raccoon sign. Bilateral periorbital ecchymosis, sparing the palpebral tarsus, manifesting 2 days after head trauma.

**Table 1** Causes of bilateral palpebral ecchymosis.

#### Trauma

Basilar skull fracture  
Facial or orbital trauma<sup>4</sup>  
Nasal or orbital surgery

#### Autoimmune, inflammatory diseases

Sweet syndrome<sup>5</sup>  
Chronic atypical neutrophilic dermatosis with lipodystrophy and elevated temperature (CANDLE)  
Neonatal lupus erythematosus  
Pigmented lichen planus

#### Metabolic disorders

Amyloidosis  
Myxoedema

#### Oncological diseases

Multiple myeloma  
Metastatic neuroblastoma  
Orbital metastases  
Kaposi sarcoma  
Acute myeloid leukaemia  
Lymphoblastic lymphoma

#### Vascular diseases

Cerebral venous thrombosis  
Temporal arteritis

#### Others

Trigeminal autonomic cephalalgia  
Migraine  
Endoscopic retrograde cholangiopancreatography  
Haemophilia  
Frontal sinus mucocele  
Sneezing, coughing, and vomiting

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.neurop.2024.100152>.

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