



Leukocoria is a term to describe the appearance of a 'white pupil'. Such an abnormal appearance may be due to an anomaly of the retina or from a reflective opacification within the ocular media along the visual axis at the pupillary area.¹

The appearance of leukocoria should never be ignored or overlooked as the eye may harbour a life-threatening tumour, most notably retinoblastoma. Ordinarily urgent referral to an ophthalmologist is indicated.² Apart from retinoblastoma, there are a number of conditions that can produce leukocoria. These include cataract, persistent hyperplastic primary vitreous, Toxocara chorioretinitis, Coats' disease and retinopathy of prematurity.

However, a white reflection from the eye observed in a photograph, while alarming, may not necessarily mean that true leukocoria indicative of pathology is present.

In this report we present a case of two-and-a-half-year-old child with suspected leukocoria in the left eye noted in a photograph. The motivation for this visit was a picture that was taken by the parents showing a white reflex in the left pupil (Figure 1). A friend, who is a paediatrician, noted the abnormality and was concerned about retinoblastoma. The parents had not noted the problem previously. Their daughter is looking to the right in this picture, away from the camera. This finding was only present on this single picture but not on other pictures, as can be seen in another image taken from another family photograph (Figure 2).

Eye examination revealed full motility and normal pupils showing no relative afferent pupillary defect. Unaided vision was 6/9 with Kay Pictures in both eyes. Refraction gave R +1.00 DS L +0.50DS under cycloplegia. Assessment of eye position showed no manifest strabismus to Hirschberg and cover test. Stereopsis was present with the Lang test, the ocular media appeared clear to ophthalmoscopy and retinoscopy. The ocular fundi appeared normal, with cup-disc ratio of 0.3 in each eye, and the disc margins were distinct. The macula showed a normal reflex and no fundal abnormalities could be detected. Optomap laser scanning ophthalmoscopy captured wide field images confirmed and documented no apparent abnormality of either the ocular media or fundi. The parent was reassured that no abnormality was present and that thankfully the

Leukocoria in an off-set picture in a healthy eye

Simon Barnard, Carolin Truckenbrod and Alex Levit describe a case of photographic trompe l'oeil



Figure 1 White reflex in the left eye

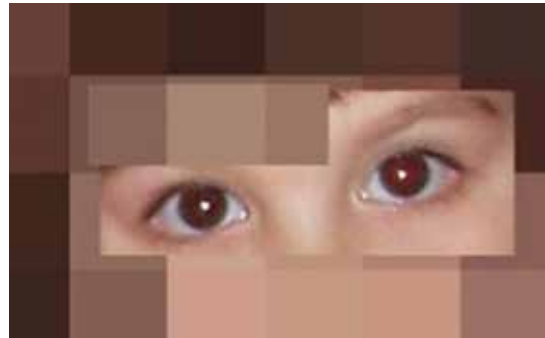


Figure 2 Normal reflexes

anomaly noted in the photograph was an artefact.

The child was scheduled a six-month review and at the follow-up visit at three years of age her unaided vision was 6/7.5 with each eye and stereopsis was 100" with Titmus animals. The ocular media and fundi were normal.

The presence of an apparent leukocoria in a normal eye in a picture taken from a temporal side has been reported previously.^{3,4} This finding can occur repeatedly in the same patient but always in one eye only.³

The phenomenon seems to occur when pictures are taken of eyes with undilated pupils with an amateur camera and a flash. This finding seems only to have been reported with cameras with which the flash is created coaxially to the camera lens. The distance at which the picture was taken seems to play a minor role. In pictures of normal eyes with a white reflex the subject fixes approximately 15° off-axis to the camera and the nasal retina is illuminated by the flash. The mechanism of this artefact is the

bright light from the flash entering the eye and illuminating the optic disc. The optic nerve head acts as a diffuse reflector, reflecting and scattering the light. Assuming the optic nerve was a perfect mirror, illumination of only 3.3 per cent of the nerve could cause a reflection, leading to a white reflex in the picture. As the optic nerve does not have the properties of a perfect mirror it must be assumed that a wider area of the nerve needs to be illuminated by the flash in order to result in a white reflex. Still, illumination of a relatively small portion of the optic nerve could result in leukocoria on a picture.³ This makes it more likely to produce an artefactual white pupil as the axis of the camera does not necessarily need to be perfectly aligned with the optic nerve head.

Discussion

Leukocoria may be apparent in photographs taken with a flash camera and may occur in a normal eye, producing a false positive on photo screening.⁴ However, this artefact is uncommon and it is imperative that leukocoria of any type is thoroughly investigated.

In the past, amateur flash photography of babies and infants by family members had a significant role in the initial detection of retinoblastoma through a 'white pupil' showing up in photographs. It is very possible that the advent of automated 'red-eye' removal software integrated in cameras has affected detection rates. Anecdotally, there is an awareness of one patient whose grandfather 'Photoshopped' out the white reflex and delayed diagnosis of retinoblastoma.⁵ ●

References

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