The role of non-leukocoria red reflex referrals in detecting ocular pathology in an ethnically diverse population: a multi-centre study

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Introduction and Purpose

- The 'red' reflex test is a key non-invasive screening tool used to identify serious eye conditions, such as retinoblastoma and cataracts, in children and infants.[1] It is performed as part of the Newborn and Infant Physical Examination (NIPE), which also recommends an examination of the parents.
- While it is important to screen for leukocoria (a white pupil seen with the naked eye), the value of an absent or abnormal 'red' reflex is unclear.
- The normal appearance of the 'red' reflex varies by ethnicity, rarely appearing red. In addition, interpretation of the colour is subjective. In our experience, this can lead to over-referral of babies from non-white ethnicity.
- The aim of the study was to evaluate the diagnostic value of an absent or abnormal "red" reflex in an ethnically diverse cohort.

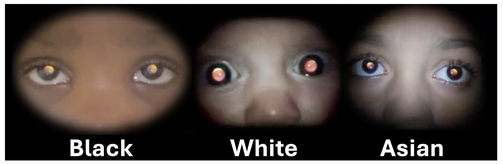


Figure 1. "Red" Reflex Variations Across Ethnic Groups

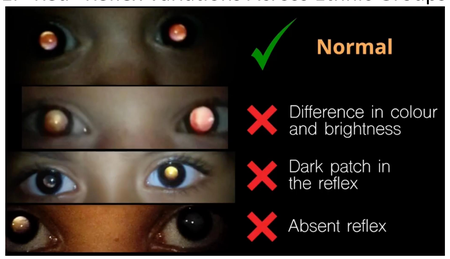


Figure 2. Normal vs True Absent/Abnormal "Red" Reflexes That Need to be Examined Urgently

Methods

All absent/abnormal 'red' reflex referrals received at 2 major paediatric services in London were retrospectively reviewed.

Data was collected from electronic patient records, as part of two clinical audits at Moorfields Eye Hospital (January–December 2022) and Royal London Hospital (January 2021–February 2023). This includes patient demographics, source and reason(s) for referral, and lag time between referral and appointment.

The examination outcomes were as follows:

1. Normal examination
2. Urgent condition: Cataract or Retinoblastoma
3. Non-urgent condition: Amblyopia risk factors

Results

- 43 non-leukocoria (absent/abnormal) referrals received.
- Median age: 3 months (range 1–84)

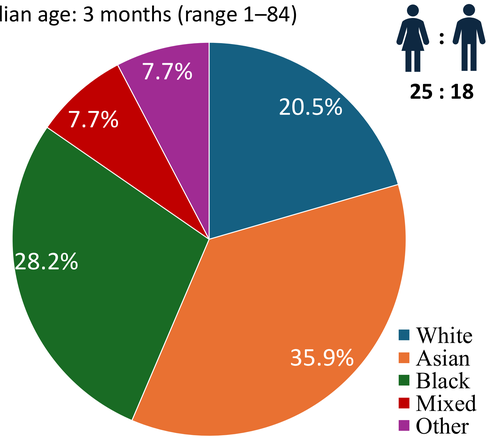


Figure 3. Ethnicity of Absent/Abnormal Red Reflex Referrals

Source of referrals

- The main source of referrals was general practitioners (86.1%).

Referral source	No. (n = 43)	%
General practitioners	37	86.1
Optometrists	1	2.3
Neonatologists/ paediatricians	5	11.6

Table 1. Referral Sources for Absent/Abnormal Red Reflexes

Time between referral and hospital examination

- 76.7% referrals were seen within 14 days of referral*
- Median lag time: 6 days (range 0–71)

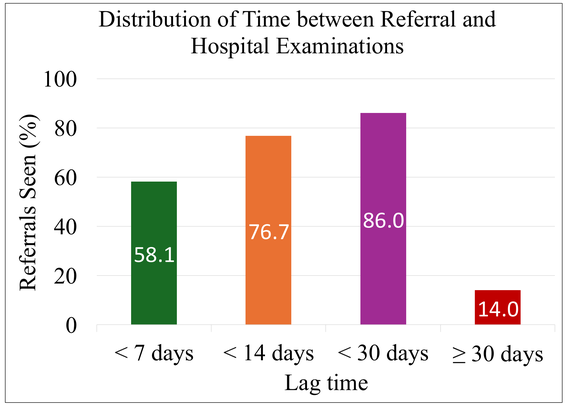


Figure 4. Time between Referral and Examination of Absent/Abnormal Red Reflex Referrals

**These patients were seen under the 2-week-wait cancer referral pathway in the UK.*

Examination outcomes

- **92.8%** of referrals had a normal examination
- No urgent conditions were found
- 2 non-urgent strabismus and 1 high refractive error

No referral mentioned an examination of parental reflex.

Conclusion

- Our study confirmed a low diagnostic value of absent or abnormal "red" reflex testing in an ethnically diverse population of children and infants.
- A high proportion (41 out of 43) of false positives may lead to parental anxiety and unnecessary burden on paediatric ophthalmology services.
- The low proportion of white children and infants suggests that there is misinterpretation of the "red" reflex amongst non-white babies.

Recommendations:

1. **Terminology** – shift to a racially inclusive ('glow' reflex) or anatomically based ('fundus' reflex) term [2]
2. **Approach** – perform parental reflex comparisons, improve awareness and training for clinicians.

Disclosures and References

There are no financial conflicts of interest to disclose.

[1] How to test for the red reflex in a child. (2014). Community Eye Health, [online] 27(86), p.36. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC4194850/.

[2] Kelly, C., Anderson, M., Smith, H., Obaid Kousha, Hitchcott, N., Reddy, M.A. and Blaikie, A. (2024). Decolonising the 'red' reflex test: transitioning from terminology based on colour to anatomy. Eye. [online] doi:https://doi.org/10.1038/s41433-024-03433-2.

Scan QR codes to watch videos on how to perform the fundal "red" reflex examination

https://shorturl.at/FKlsB
https://shorturl.at/LjlQW

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