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Time to drop the phenylephrine from the paediatric cycloplegia protocol: informing practice through audit

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Cycloplegic retinoscopy is the gold standard refraction approach in children. Various protocols are in use to achieve cycloplegia during outpatient appointments. Many use not only the muscarinic antagonist, cyclopentolate (CP), which paralyses the ciliary muscle, but also the alpha-adrenergic agonist, phenylephrine (PE), which as a mydriatic paralyses the iris constrictor, but has no effect on the ciliary muscle. Whilst mydriasis facilitates visualisation of the retinoscopy reflex, there is a risk of underestimating hypermetropia. Published evidence suggests that repeated

instillation of CP only is effective even for brown and very dark irides [1–3].

To develop a Patient Group Directive (PGD) we carried out a two-cycle audit (CA18/PA/02). The first round evaluated our current protocol: blue iris, CP 1% once (0.5% if age < 3 months); brown iris, CP/PE 2.5% once; very dark iris, CP/PE twice, 10–15 min apart; repeated if pupils still constrict on pentorch illumination. As standard, we set full dilation in 90% within 30 min, i.e. the level expected for blue irides with a single CP drop [4].

In the second round, we only included children with brown or very dark iris, administering CP twice or three times, respectively, 10–15 min apart.

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Table 1 Ethnic background and iris colour of children assessed in this audit

	Round 1		Round 2	
	<i>n</i>	%	<i>n</i>	%
<i>Ethnicity</i>				
Afro-Caribbean	5	9	10	20
Asian	7	13	19	37
Caucasian	44	79	20	39
Chinese			1	2
Other			1	2
<i>Iris colour</i>				
Blue	32	57		
Brown	11	20	14	27
Very dark	13	23	37	73

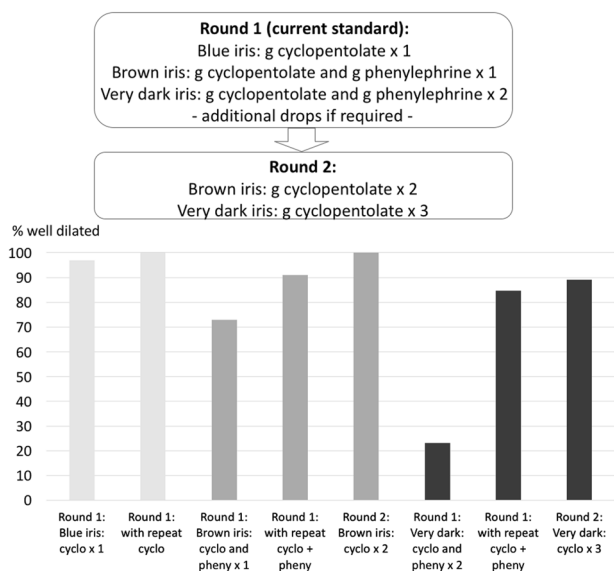


Fig. 1 Proportion of well-dilated pupils in rounds 1 and 2 of the audit. Eyes with blue irides are well dilated after one application of cyclopentolate (CP). In brown irides, application of CP twice increases the proportion of well-dilated pupils, and in very dark irides, application of CP three times is effective. Phenylephrine does not appear to enhance this effect

We assessed pupil constriction to pentorch illumination, standard when deciding whether additional drops are required. We also noted time from instillation of the first drop to pentorch test.

We evaluated 107 consecutive children (Table 1). Round 1 found that pupils were dilated in 97% of children with blue, 73% with brown, and 23% with very dark iris (Fig. 1), at a mean 24 min (SD 18) after first drop. Repeat instillation increased success to 100%, 91%, and 85%, respectively. In

the second round, pupil dilation was achieved in all children with brown iris, and in 89% with very dark iris, at a mean 32 min (SD 13) after first instillation.

Our use of pupil constriction as outcome measure, which assesses mydriasis, not cycloplegia, is a limitation. However, as we found that better dilation is achieved without the use of PE, this audit has changed our practice and contributed positively to the development of the PGD.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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