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Correspondence

Low-concentration atropine: Co-management of myopia in children and young people in the UK – prospective case series

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Dear Editor,

Faced with early-onset and rapidly progressing myopia in children, parents/carers and clinicians are increasingly interested in myopia management. In the UK, dual-focus contact lenses (DFCL) have been available since 2017,[1] and defocus-incorporated multiple-segment spectacle lenses (DIMS) since early 2021.[2] Clinical trials of low-concentration atropine are ongoing. No treatment is NHS-funded, and real-life decision making revolves around availability, affordability and tolerability. We have used atropine 0.01 and 0.05% in our private clinic since August 2020.[3,4] We frequently co-manage children, with community optometrists prescribing optical options. Here we review our early experience, focusing on demographics, treatment used, and outcomes at 6 and 12 months. This work was registered as trust service evaluation.

Between 13/08/2020 and 24/11/2022, 105 children attended (Table 1). Mean age (standard deviation SD) at first visit was 9.5 (3.0) years. 56 were girls (53.3%). Two had underlying conditions, iridochorioretinal coloboma and rod/cone dystrophy. Mean (SD) cycloplegic spherical equivalent and axial length right eye (RSE, RAL) were −3.59 (1.88) D and 24.86 (1.21)mm. The outcome of the first visit was: no treatment started/family to explore options in 16.2%, start/continue atropine monotherapy in 58.2%, add atropine as second treatment in 13.4%, continue dual therapy (combining an optical and a pharmacological intervention) in 3%, continue optical monotherapy in 7.6%.

58 children attended 6-month follow-up. 53.4% were using atropine monotherapy, 43.1% dual treatment and 3.4% optical monotherapy. Mean (SD) change in RSE and RAL was +0.31 (+1.36) D and +0.07 (0.13) mm, with dual treatment associated with smallest axial elongation (Table 2). Dual treatment was continued in 38.9%, atropine monotherapy in 35.2%, optical monotherapy in 3.75%, and in 22.2% treatment was increased, by increasing the concentration of atropine to 0.05% or by adding an optical option to atropine. In those who had started atropine, there was no statistically significant change in visual acuity for distance or near or intraocular pressure

Table 1. Demographic and clinical details.

Ethnic background	
White	37.1%
East-Asian/British	30.5%,
South-Asian/British	24.8%,
Mixed	2.9%
Middle-Eastern	1.9%
Black/British	1.0%
Unknown	1.9%
Iris colour	
Brown	65.7%
Blue/blue-green/hazel	26.8%
Not recorded	7.6%
Current treatment at first consultation	
None or single-vision glasses/contact lenses	70.5%
atropine monotherapy between 0.01 and 1%	6.8%
Monotherapy defocus-incorporated multiple segment lenses (glasses)	15.3%
Monotherapy dual-focus contact lenses	1%
Monotherapy orthokeratology contact lenses	1.9%
Dual therapy optical option plus low-concentration atropine	3%

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Table 2. Progression of cycloplegic spherical equivalent and axial length right eye over first 6 and 12 months of treatment. DIMS, defocus-incorporated multiple segment spectacle lenses.

		Mean (SD) progression (right eye) over first 6 months			Mean (SD) progression (right eye) over second 6 months	
	n	spherical equivalent (D)	axial length (mm)	n	spherical equivalent (D)	axial length (mm)
monotherapy atropine 0.01%	9	−0.54 (0.54)	0.12 (0.20)	6	+0.31 (0.45)	0.07 (0.05)
monotherapy atropine 0.05%	16	+0.19 (0.52)	0.07 (0.10)	5	+0.04 (0.53)	0.10 (0.05)
dual atropine 0.05% plus DIMS	11	+0.79 (1.87)	0.01 (0.10)	8	−0.26 (0.50)	0.09 (0.15)

(paired-sample t-test two-sided $p > 0.1$); pupil diameter increased by a mean 1 mm (SD1.3, $p < 0.001$). In those not starting atropine or continuing with the same concentration, there was no change in any of these parameters.

30 children attended 12-month follow-up. 36.7% were on atropine monotherapy, 50% on dual therapy, 6.7% on triple therapy (DFCL/DIMS/atropine), 3.3% on optical monotherapy and 3.3% on no treatment. Mean (SD) change in RSE and RAL was +0.06 (+0.78) D and +0.09 (0.09) mm. Dual treatment was continued in 43.3%, atropine monotherapy in 30%; 3.3% continued triple therapy, one wanted to reconsider options, and in 20% treatment was increased.

Atropine was not discontinued or the concentration reduced because of adverse events in any case over 12 months.

Whilst this cohort suffers from selection bias and has no control group, it gives some relevant insights: In the UK, families seeking myopia management are ethnically diverse. Myopia can be co-managed by community optometrists providing optical options, and ophthalmologists, low-concentration atropine. Like others, we observe a synergistic effect when combining optical and pharmacological options.[5,6]

Conflict of interest

The author is principal investigator on three clinical trials of low-concentration atropine for myopia in children and medical advisor for Thea, SightGlassVision and Santen. She has contributed educational articles for eye health professionals to CooperVision.

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References

1. Chamberlain P, Peixoto-De-Matos SC, Logan NS, et al. A 3-year randomized clinical trial of MiSight lenses for myopia control. *Optom Vis Sci* 2019 Aug 1; 96: 556–567.
2. Lam CSY, Tang WC, Tse DYY, et al. Defocus incorporated multiple segments (DIMS) spectacle lenses slow myopia progression: a 2-year randomised clinical trial. *Br J Ophthalmol* 2020 Mar 1; 104: 363–368.
3. Yam JC, Jiang Y, Tang SM, et al. Low-Concentration atropine for myopia progression (LAMP) study: a randomized, double-blinded, placebo-controlled trial of 0.05%, 0.025%, and 0.01% atropine eye drops in myopia control. *Ophthalmology* 2019 Jan 1; 126: 113–124.
4. Németh J, Tapasztó B, Aclimandos WA, et al. Update and guidance on management of myopia. European society of ophthalmology in cooperation with international myopia institute. *Eur J Ophthalmol [Internet]* 2021 May 1 [cited 2022 Feb 16]; 31: 853–883. Available from: https://pubmed.ncbi.nlm.nih.gov/33673740/
5. Huang Z, Chen XF, He T, et al. Synergistic effects of defocus-incorporated multiple segments and atropine in slowing the progression of myopia. *Sci Rep* 2022 Dec 24; 12(1): 1–6. https://doi.org/10.1038/s41598-022-25599-z.
6. Nucci P, Lembo A, Schiavetti I, et al. A comparison of myopia control in European children and adolescents with defocus incorporated multiple segments (DIMS) spectacles, atropine, and combined DIMS/atropine. *PLoS One* 2023 Feb 16; 18(2): 1–11. https://doi.org/10.1371/journal.pone.0281816