

Contact Lens Update

CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Current information and trends in Myopia Control

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In the Treatise of Human Nature, published in 1739, David Hume observed that the more distant something is in time and space, the less we care about it. Although written in past times, the topic of myopia control taps into this interesting human paradox, as the failure to take effective action now does not present consequence until considerable time into the future.

To investigate how sizeable this problem might become, researchers from the Brien Holden Vision Institute recently published a systematic review and meta-analysis on global prevalence of myopia and high myopia.¹ Filtering through 4288 research articles on prevalence of refractive error or myopia the authors were left with 145 valid articles to form their analysis. Global prevalence of myopia was reported as 22.9% in 2000 rising to 28.3% in 2010. When projected forward to 2050 the authors predict that, at current trends, global prevalence of myopia will become 49.8%, with 9.8% of the global population being highly myopic ($-6.00D$ or more). Even if we consider this data to be an over-estimate, it is safe to conclude that the prevalence of myopia is growing at an alarming rate.

As eye care practitioners it is our lifeblood to correct myopia, but the problem is not the correcting but the long term health implications of myopia, particularly when we take extending longevity of life into consideration. There is a 4x likelihood of developing retinal detachment from as little as $-0.75D$ through $-3.00D$ compared to the emmetrope, with the odds increasing to 10x once past $-3.00D$.² Myopia increases risk of developing glaucoma, with an odds ratio of 1.65 for up to $-3.00D$ increasing to 2.46 when greater than $-3.00D$,³ and posterior sub capsular cataract.⁴ Myopia from $-2.00D$ up to $-4.00D$ brings a 3 times risk of posterior sub capsular cataract, increasing to 5 times for myopia from $-4.00D$ up to $-6.00D$ and 12 times for $-6.00D$ and greater.⁵ But by far the most worrying, is myopic maculopathy, which stands out as the only disease amongst the top five causes of blindness that remains entirely untreatable.⁶ The Blue Mountains Study reported 25.3% prevalence of myopic maculopathy in those with greater than $-5.00D$ of myopia, increasing to more than 52.4% once beyond $-9.00D$.⁷

The good news is that slowing the progression of myopia from the onset would have a dramatic effect on reducing incidence of high myopia in later life, with 33% myopia control effect leading to a reduction of 73% in the frequency of myopia greater than $-5.00D$, while a 50% myopia control effect would reduce frequency to over 90%.⁸ Fortunately, we have multiple treatment options available to provide such an effect. Studies investigating multifocal contact lens designs report 34-50% reduction in myopia progression,⁹⁻¹¹ while orthokeratology (OK) studies demonstrating a consistent 50% myopia controlling effect.¹² For those that can prescribe pharmaceuticals, atropine has demonstrated up to 72% reduction in myopia progression,¹³⁻¹⁵ though there is a lack of consensus on optimum concentrations and there appears to be a rebound effect following cessation of treatment.¹⁶⁻²⁰

Taking all of this evidence into consideration, optometry is perfectly placed to slow the myopia epidemic. Its retail practice structure promotes readily available access to the public and lines of communication that are less

available to many other health professions. We are able to push information about the myopia problem through our websites and marketing literature, while the typical consultation process lends itself to communicating the valuable message that spending more time outside while reducing screen time can help slow both the onset and progression of myopia.²¹ Yet, a recent globally conducted practitioner questionnaire revealed that, despite there being high practitioner concern about the frequency of paediatric myopia, particularly across Asia, in 47.8% of cases single vision spectacles were prescribed for progressing or young myopes, followed by single vision contact lenses in 15.2% of cases.²² Factors for preventing the prescription of a myopia control approach were listed in decreasing order as: uneconomical; inadequate information; unpredictable; safety concerns; ineffective; risk vs benefit; and that it would require additional chair time.

We currently lack sufficient information to debunk some of these concerns, as it will take time to fully understand the safety aspects of actively attempting to control myopia compared to traditional methods for correcting refraction. Likewise, the true picture of risk vs. benefit. Though we can use current data to demonstrate higher risk of developing sight-threatening disease over a lifetime of high myopia²⁻⁷ compared to the risk of contracting microbial keratitis from wearing a contact lens²³ to limit progression of myopia to less risky levels. However, a basic literature search will reveal a plethora of information revealing that myopia control is effective,⁹⁻¹⁵ so failure for this to be observed in the survey conducted by Wolffsohn et al. can only indicate that this information is not being adequately translated to clinicians. A further barrier is lack of accepted frameworks and clinical protocols for incorporating myopia control into practice.

On this backdrop, the recent convening of practitioners and researchers by the United States FDA to initiate discussions for developing FDA approval protocols for myopia control is long overdue, as despite the powers of FDA approval being limited to the United States, products that are approved generally give confidence in their use across the world. However, despite this welcome initiative, even if the planets perfectly align to facilitate speedy progression, we are unlikely to see the first FDA-approved myopia control device for a few years, which in the interim tosses the ball back into the practitioner's court. While on current trends we may prefer to take the tried and tested option of single vision correction, the evidence for slowing progression of myopia using existing contact lens options suggests that we should be more proactive in the management of myopia. This then raises the question of confidence in fitting children with contact lenses.

Wolffsohn et al. found that contact lens myopia control options were only considered appropriate for older children, with OK and multifocal soft contact lenses considered as appropriate from an average 8.8 years and 8.9 years respectively.²² The same survey reported -2.00D of myopia as the stage when myopia control devices would be considered. With higher rates of progression occurring in the early stages of myopia,²⁴ it could be argued that starting a myopia control strategy early, rather than waiting until -2.00, is more likely to yield greater likelihood in reducing high myopia in adulthood. The reducing age of myopia onset may cause consideration for fitting younger children,²⁵ but current evidence suggests that we can be confident in fitting soft, rigid and orthokeratology lenses from eight years of age.²⁶⁻²⁹ Fitting pre-teen children aged 8-12 years with contact lenses does require 10-15 minutes more chair time than teenagers, mainly on contact lens application and removal, but otherwise they have similar outcomes.³⁰ Pre-teens also report contact lens wear to improve their physical appearance, athletic competence and social acceptance compared to glasses.²⁷

Returning to my opening line, we must keep all of these factors in mind as we consider how our actions managing myopic children today will impact their lives in the future. The U.S. FDA initiating discussions about regulating myopia control products indicates that in the not too distant future myopia management rather than correction will become the norm, and the steadily growing number of myopia control articles in clinical journals shows that some are already on board. So if you are not already managing myopia the question boils down to when, rather than if, you will join them, and ultimately amid growing evidence, how long you are prepared to wait.

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