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Global trends in myopia management attitudes and strategies in clinical practice

James S. Wolffsohn[a,*], Antonio Calossi[b], Pauline Cho[c], Kate Gifford[d], Lyndon Jones[e], Ming Li[f], Cesar Lipener[g], Nicola S. Logan[a], Florence Malet[h], Sofia Matos[i], Jose Manuel Gonzalez Meijome[i], Jason J. Nichols[j], Janis B. Orr[a], Jacinto Santodomingo-Rubido[k], Tania Schaefer[l], Nilesh Thite[m], Eef van der Worp[n], Madara Zvirgzdina[a]

[a] Ophthalmic Research Group, School of Health & Life Sciences, Aston University, Birmingham, UK
[b] Department of Physics (Optics and Optometry), University of Florence, Italy
[c] School of Optometry, The Hong Kong Polytechnic University, Hong Kong Special Administrative Region
[d] Gerry & Johnson Optometrists, Brisbane, Australia
[e] Centre for Contact Lens Research, University of Waterloo, Waterloo, Ontario, Canada
[f] Eye Hospital of Wenzhou Medical University, China
[g] Contact Lens Section, Federal University of São Paulo/Paulista School of Medicine São Paulo, Brazil
[h] Point Vision Bordeaux, Ophthalmologic Center, Bordeaux, France
[i] Clinical and Experimental Optometry Research Lab (CEORLab) – Center of Physics, University of Minho, Portugal
[j] University of Alabama at Birmingham School of Optometry, Birmingham, AL, USA
[k] Menicon R&D Innovation Centre, Fondation Pour Recherches Medicales, Geneva, Switzerland
[l] Clinica Schaefer, Curitiba, Parana, Brazil
[m] International Association of Contact Lens Educators, Pune, India
[n] Eye Research Institute Maastricht, University of Maastricht, Maastricht, the Netherlands

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ABSTRACT

Purpose: Myopia is a global public health issue; however, no information exists as to how potential myopia retardation strategies are being adopted globally.
Methods: A self-administrated, internet-based questionnaire was distributed in six languages, through professional bodies to eye care practitioners globally. The questions examined: awareness of increasing myopia prevalence, perceived efficacy and adoption of available strategies, and reasons for not adopting specific strategies.
Results: Of the 971 respondents, concern was higher (median 9/10) in Asia than in any other continent (7/10, $p < 0.001$) and they considered themselves more active in implementing myopia control strategies (8/10) than Australasia and Europe (7/10), with North (4/10) and South America (5/10) being least proactive ($p < 0.001$). Orthokeratology was perceived to be the most effective method of myopia control, followed by increased time outdoors and pharmaceutical approaches, with under-correction and single vision spectacles felt to be the least effective ($p < 0.05$). Although significant intra-regional differences existed, overall most practitioners 67.5 (±37.8)% prescribed single vision spectacles or contact lenses as the primary mode of correction for myopic patients. The main justifications for their reluctance to prescribe alternatives to single vision refractive corrections were increased cost (35.6%), inadequate information (33.3%) and the unpredictability of outcomes (28.2%).
Conclusions: Regardless of practitioners' awareness of the efficacy of myopia control techniques, the vast majority still prescribe single vision interventions to young myopes. In view of the increasing prevalence of myopia and existing evidence for interventions to slow myopia progression, clear guidelines for myopia management need to be established.

* Corresponding author at: Life and Health Sciences, Aston University, Aston Triangle, Birmingham B4 7ET, UK.
E-mail address: j.s.w.wolffsohn@aston.ac.uk (J.S. Wolffsohn).

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1. Introduction

The prevalence of myopia has approximately doubled in the past three decades [1–3], arguably reaching epidemic levels. Prevalence rates of 70–87% have been reported amongst populations of schoolchildren and young adults in Asia [1,4–8], and around 20–50% in America and Europe [9–12]. Moreover, the onset of myopia in the last two generations has been reported to occur earlier [1,13,14] leading to an increased prevalence of high myopia (≥ −6.00 D). High myopia is strongly associated with an increased risk of sight-threatening pathological ocular comorbidities, [1,15] including retinal detachment, glaucoma, and cataract [16–21]. A study conducted in Taiwan [1], comparing the age of onset and prevalence of myopia amongst schoolchildren from 1983 to 2000, shows an alarming shift towards a more myopic refractive error in recent years; in 1983, the mean onset of myopia was 11 years, whereas, in 2000, it was eight years; the mean refractive status observed at eight years of age was 0.45 ± 1.03 D and −0.15 ± 1.40 D in 1983 and 2000, respectively, whereas at 11 years of age it was −0.27 ± 1.72 D and −1.20 ± 1.93 D, respectively.

A range of factors including genetic predisposition [22–27], inadequate near accommodation response [28,29], elevated AC/A ratio/esophoria [30,31], excessive time spent undertaking near work [25,32–34], low levels of outdoor activity [35–39], lighting levels [36,40,41] and the magnitude of hyperopic peripheral defocus [42–50] have been linked to the development and/or progression of myopic refractive error. However, the exact mechanisms surrounding both myopia development and progression are not yet fully understood as the disease appears to be multifactorial in nature.

Over the past few years, there has been significant research and clinical interest in so-called 'myopia control' approaches, being clinical methods which are designed to be beneficial for attenuating childhood myopic progression. Sankaridurg and Holden [51] discussed the potential benefit that a six year-old east-Asian child with −1.00 D of myopia could have, at age 15 years, if myopia progression was reduced by 30.0%, using an evidence-based model of progression rates of myopia. If this child's myopia progressed at the rate predicted by available natural history data, they would be expected to develop myopia in the order of −7.00 D by 15 years of age. If the myopia progression had been retarded by an estimated 30% over the eight-year follow-up period, then −5.50 D of myopia would be predicted. In a review paper, Flitcroft [17] highlighted that the higher the myopic refraction, the higher the odds ratio for myopic maculopathy, retinal detachment and, to a lesser extent, glaucoma and cataract. For example, compared to an emmetropes, the odds ratio for developing myopic maculopathy is 40.6 (95% confidence interval: 13.3–124.4) for myopia of −5.00 to 6.99 D, but increases to 126.8 (34.0–472.3) for myopia of −7.00 to 8.99 D [17,21]. Similarly, the odds ratio for developing retinal detachment is 21.5 (17.3–26.7) for myopia of −5.00 to 6.99 D, but increases to 44.2 (34.2–57.2) for myopia of −7.00 to 8.99 D [17,52]. It has been estimated that reducing the rate of myopia progression by 33% would lead to a reduction of 73% in the frequency of high myopia (<−5.00 D) [53]. Lower levels of myopia have a reduced risk, but as the number of people with lower levels of myopia is greater, the public health risk of any myopia is still significant [17].

Multiple options are currently available for myopic refractive correction, including single vision, bifocal and progressive addition lens (PALs) spectacles, soft and rigid contact lenses (including orthokeratology) and refractive surgery. However, the relative contribution of these clinical methods for retarding myopia progression has only been more thoroughly investigated in more recent years (Fig. 1) [54–76].

It has been suggested that conventional single vision spectacle lenses may be ineffective for myopia control as they induce peripheral hyperopic defocus, a factor speculated to promote eye growth [47,48,77,78]. However some authors have questioned whether peripheral eye focus is the primary mechanism driving eye growth, as they reported that some myopic children wearing single vision spectacles had greater relative myopic defocus, and thus myopia progression was less than it was in those children wearing single vision spectacles with relatively greater hyperopic defocus [67,79]. Other large studies in humans have also found peripheral refraction to neither affect myopia onset or development [64,80]. Progressive addition and bifocal lenses have been

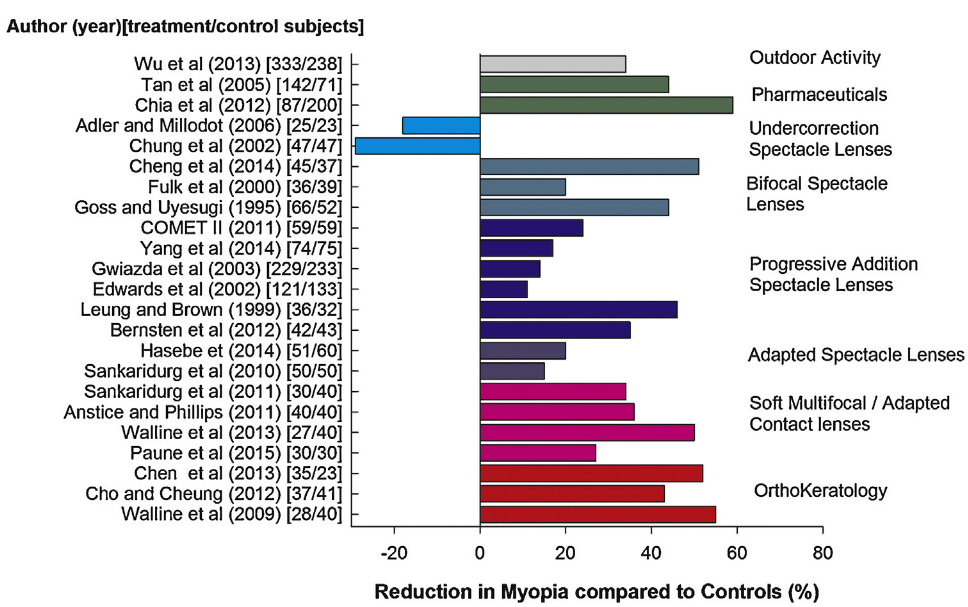

Fig. 1. Comparative studies [53–76] of the effectiveness (over the evaluated period) of different techniques to retard the progression of myopia.