"No child of mine is wearing glasses!"

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Competencies covered:

Dispensing opticians: **Communication, Refractive Management, Paediatric Dispensing**

Optometrists: **Communication**

Sometimes, in practice, parents of children who have been found to be myopic are reluctant to allow their children to wear their spectacles. This viewpoint can be a result of many different factors – ranging from seemingly-trivial concerns over the cosmetic aspect of wearing spectacles through to worries that wearing a correction of some kind will make the eyes 'weaken' or encourage a myopic prescription to increase.

As an example, in the author's practice, a young girl who was found to require around a -2.00D correction in each eye was keen to try contact lenses, to complement her new spectacles. Her father was very much against this idea on the grounds that while spectacles could be removed when not especially required, the more constant correction by contact lenses would encourage her prescription to increase and her uncorrected vision to worsen. In this case, the father had come across some information on early-onset myopia (EOM) and believed that he was serving his daughter's best interests by encouraging her to remain uncorrected as much as possible.

As research into the causes of early-onset myopia is increasing in frequency, more parents in the same situation are becoming aware of it as a possible factor in their children's eyecare, and the idea that 'wearing glasses will make my child's eyes worse' is coming up more frequently in practice.

It's beyond the scope of this article to examine the exact causes of EOM, other than to summarise general theories and opinions. This only serves, though, as background for the more practical question to review: in terms of a child's general well-being, is it better to risk an increased level of myopia by having a child routinely wear their correction, or is it better to wear any correction as infrequently as possible?

Whether a parent is concerned specifically about EOM, or has reservations about their child wearing a correction for other reasons, the standard response from a dispensing optician in practice is normally: "Of course it's better to wear the correction". However, it's worthwhile to actually review and be aware of

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current literature that, in this situation, offers support for what the dispensing optician's best course of action should be. Any conclusions can then be used in practice to offer more evidence-backed advice.

Due to its more frequent discussion by parents, this article will first provide a little background on EOM. Then, in examining the consequences of increased myopia (which parents are often ultimately trying to avoid), research into potential detrimental ocular effects will be complemented by considerations of wider, more generalised differences in quality of life between patients wearing their myopic corrections or not. We can then aim to reach an evidenced conclusion as to whether it is in a young patient's best interests to correct their myopia to a good level of distance visual acuity, or to leave them uncorrected as often as possible.

Early-onset myopia

Early-onset myopia (EOM) is the name given to a progressive increase of myopia in an individual during their youth – potentially identified from around the age of five, with the prescription sometimes fluctuating until as late as around the age of 21. For myopia in general, the misplacement of the retinal image (forward of the retina) can be caused by one of three factors: 1) the optical system of the eye (the main elements of which are the cornea and crystalline lens) being too powerful; 2) the effective refractive index of the eye being too high; or 3) the axial length of the eye being too long. EOM falls into the third type, a kind of axial myopia, because it is thought to be centred around the eye gradually becoming longer than would be 'matched' with the eye's optical system as the patient grows.

Due to apparent stabilisation of EOM at around -3.00D[1], initial research into its cause was directed at a potential link between prolonged accommodation during near work (a -3.00D uncorrected myope generally will not accommodate any more for near work) and magnitude of myopia. Dispensing solutions aimed at working within this theory include dispensing bifocals and progressive-power lenses to reduce the accommodation required for near (which have themselves occasionally been shunned by parents on cost or cosmetics grounds).

Other considered factors in EOM have ranged widely from simple hereditary reasons, to time spent outdoors, to the elasticity of the choroid. Small communities have appeared to show variation in myopia to positively correlate with an individual's amount of near work[2]; on the other hand, larger, more genetically-diverse communities who all share a higher level of near-work may show a general increased risk of early-onset myopia[3], but not at the consistent level to be expected if near work was the only factor.

These are only a sample of theories as to EOM's cause. Although research into a definite cause is ongoing, this in itself may be a useful point to make in practice. There is certainly little evidence to suggest whether wearing a correction more or less has any effect on the progression of a child's myopia. Where parents are concerned about their children wearing some form of vision correction, whether concerned about EOM or otherwise, it is worthwhile to examine evidence for how that correction will affect their child's quality of life.

Measuring quality of life

Research into the assessment of quality of life outlines that it can offer "important information on the impact of disease and treatment on physical, psychological, and social functioning and well-being"[4]. These assessments translate a patient's objective impairments into both objective and subjective descriptions of how much (if any) of a disability or handicap they cause. The same research suggests that, "Quality of life, by its very nature, is idiosyncratic to the individual, but intuitively meaningful and understandable to most people". There is the suggestion here that if a general description of quality of life with poor visual acuity can be arrived at satisfactorily, then it may be a useful tool in explaining its effects to parents of myopic patients.

Assessment of quality of life in children by the children themselves presents a number of problems of its own[5] – aside from the potential for children to be less able to understand what is being asked of them, children who are afflicted in some way (however minor) often have no memory of being unafflicted – a 'base state' to which their present situation can be compared. This is comparable in optics to children not being aware that their vision is blurred through ametropia, since their vision is 'normal' to them.

Analysis of quality of life in children as part of a controlled study of any kind also presents many ethical issues, which limit the number of children-based studies available. There are many long-held general principles surrounding childcare and giving children the best quality of life possible; it would be difficult to convince an ethics committee to allow even one child to be deprived of current best practice where a need was shown, in order that they might act as a control subject[6].

To counter these difficulties, we can instead look at literature that involves not only vision-related quality of life in children, but also comparable adult situations (where a patient's vision has altered in some way) and lifestyle of children with vision-related problems. This could be used to suggest if there are any patterns in activities or habits amongst different groups of children and judge (although admittedly with a degree of personal bias) whether these activities suggest a better or worse quality of life.

Quality of life related to vision

In 2011, Lazon de la Jara *et al*[7] presented a study of LASIK patients; LASIK surgery is designed to improve unaided vision, so can be perhaps compared somewhat to dispensing spectacles to improve visual acuity. To be fair, it should be noted that there is a potential bias arising from the fact that all members of this study had actively chosen to have refractive surgery, so can be assumed to have already been dissatisfied with their existing visual acuity (for whatever reason).

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The study found, through analysis of quality of life questionnaires post-surgery, a statistically significant correlation between improved unaided vision and a perceived improved quality of life. This improvement could be ascribed to either improved vision, or simply not having to wear the spectacles associated with myopia anymore, so it is only suggested, rather than certain, that the improved quality of life found would be paralleled through the dispensing of spectacles to correct myopia.

Perhaps a more direct comparison could be obtained from studies of post-cataract surgery patients in China. The subjects' visual difficulties that arise from their cataracts cannot be corrected with spectacles and so any difference in quality of life is less likely to be attributed to not having to physically wear them (although phako surgery does generally aim to leave patients emmetropic for distance).

A controlled trial by He *et al*[8] suggested that patients with cataracts removed reported a better quality of life than those who remained un-operated on. Although these results were not strictly statistically significant, it can be appreciated that there may be several other factors influencing, for one, the successful outcome of phako surgery; for example, an unsuccessful lens extraction may leave a patient with poorer visual acuity than before surgery.

One limitation of this trial is that no mention is made of the subject's recorded visual acuities before and after the surgery. However, a similar trial showed comparable improvements to quality of life (although over a smaller sample size) in patients whose pre-operative visual acuities range from 6/18 Snellen to 3/60[9]. Although this extends to poorer vision that would be expected with an uncorrected -3.00D myopia, a number of subjects fall within the 6/72 approximately expected in this case and would therefore be more comparable.

Although there are similar sample biases to Lazon de la Jara *et al*'s LASIK study and possible inaccuracies in the comparison between these patients and uncorrected myopic children, this overall meta-analysis of these different pieces of evidence still strongly suggests an improvement in the patient's perceived quality of life for having better visual acuity, such as that provided by spectacles for myopia; in terms of visual acuity alone, it is likely that improved visual acuity correlates with an improved quality of life.

Although expert opinion falls fairly low on the hierarchy of evidence (even if in this case it is formed after the results of several separate studies) it is perhaps worth noting that the World Health Organisation has made specific mention of people's inability to work due to uncorrected refractive error, the negative impact on quality of life this causes and its potential correction with spectacles[10].

Despite the issues with measuring quality of life in children, there are some specific aspects that have been studied. Horwood *et al*[11] conducted a study amongst children who suffer with some form of visual defect (including wearing spectacles) and those who do not, reporting on perceived levels of victimisation amongst each group. It was found that 61.5 per cent of children who did not wear spectacles never experienced any victimisation, compared with 53.9 per cent of children who did wear spectacles. This would suggest that being dispensed with spectacles makes a child slightly more likely to be victimised by their peers; the authors of this study do suggest, however, that this could potentially be addressed by simple education programmes for pupils and increased awareness in staff in schools.

Another study found, as part of the Collaborative Longitudinal Evaluation of Ethnicity and Refractive Error (CLEERE) project, that children who develop myopia generally spend fewer hours playing outdoor sports, as well as spending more hours playing video games[12]. It is perhaps subjective to say whether either of these factors is synonymous with a better or worse quality of life, but several studies have shown a link between regular exercise and a reduction in the occurrence of heart disease, as well as other health complaints.

One limitation noted by this study is that it is currently unclear whether children partake in more activities involving near vision after first developing myopia because they can more comfortably see near tasks, whether they develop myopia as a result of spending more time viewing near objects while corrected for distance, or whether children who are pre-disposed to myopia are also pre-disposed towards enjoying playing indoors for some separate reason; this question, as well as possible, more direct links between myopia and general health, is already being explored by further research.

Studies begun in 2013 have started exploring the simple relationship between light exposure and myopia, exploring the possibility that it isn't necessarily physical activity outdoors that helps to stave off early-onset myopia, but perhaps just the amount of time a child spends outdoors[13].

In a similar vein, there is sometimes concern from parents over their children's ability to actually take part in an active lifestyle while wearing a pair of spectacles, as shown in **Figure 1**. Depending on the parent's specific issues, the dispensing optician has

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Figure 1: Wearing a correction should not limit children's outdoor pursuits

Figure 2: Protective eyewear is available for children for a variety of activities

several potential routes of discussion. There is an ever-increasing range of prescription-ready sports appliances that many dispensing opticians are familiar with, from simple wraparound-style frames, to protective spectacles, to swimming goggles. Additionally, a discussion about how readily-available sports-specific corrections are (an example is shown in **Figure 2**) may segue nicely into discussion with parents and children of how equally-common refractive error is within the sports community – 'people still enjoy an active lifestyle while needing glasses!'

Of course, there is also the possibility, depending on the individual patient, of contact lenses to explore. This is, naturally, down to the contact lens optician's discretion, but in the author's practice some of the most keen and compliant patients are young people motivated by experiencing the visual benefits of a myopic correction for the first time.

While it would be practically impossible to improve a child's uncorrected vision while enjoying their particular activity, the benefits of having clearer vision through wearing some method of correction while trying to catch a ball, watch their sporting opponents or understand a swimming instructor, for example, would hopefully be straightforward to outline to parent and patient alike.

Conclusions

Although research into quality of life amongst children is uncommon, parallel adult studies involving a sudden change to visual acuity strongly suggest that quality of life is improved with improved visual acuity. Available research into the lifestyle habits of myopic children does not make it clear whether these habits would be altered for being dispensed with spectacles, or whether they are related to being myopic by some other reason (further research into this area may be used to decide whether there is a link between myopic correction, visual acuity, and health in general). There is some evidence to suggest that wearing spectacles increases the incidence of bullying in children, but also that this can be negated by programmes in schools.

We can draw the conclusion that, overall, it is preferable to correct myopia in children where faced with the alternative of wearing no correction at all, or wearing it for limited periods. There is more (and statistically more significant) evidence that quality of life improves with visual acuity than there is to suggest that quality of life is reduced through either increased levels of myopia (due to the correction accelerating the development EOM) or the practice of wearing spectacles itself.

It may sound common sense to instruct a patient (or their parent), where necessary, that wearing their spectacles is a good idea. However, as some parents gradually become more aware of the idea that 'wearing glasses might make their child's eyes worse', or resist their child wearing correction for some other reason, it's useful to be able to draw on actual evidence to support this long-assumed advice.

Perhaps luckily, the closest that current research has come to finding a direct cause for myopia in children (so far, at least) centres around advice that is simple for a dispensing optician to give to children: lead an active, healthy lifestyle, play outdoors and enjoy the clear vision that spectacles can provide.

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