Consensus Criteria

# The "IMPACT" myopia management guidelines

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Childhood myopia is one of the major causes of visual impairment in the young population, and it is emerging as public health problem globally.[1] Over the last twenty years, there has been a significant rise in the prevalence of myopia in India, particularly among children living in urban areas.[2,3] If this trend persists, it is estimated that by the year 2050, one out of two Indian children, especially those living in urban regions, will be affected by myopia.[4] Research has shown that the rate of myopia progression in Indian children varies between −0.07 ± 0.02 D/year and −0.51 ± 0.02D/year, with younger children experiencing rapid progression, i.e., 1.00 D change/year.[5,6] This is of concern as rapid myopia progression may lead to higher degrees of myopia and/or pathologic myopia that is visually debilitating in the long run. Moreover, certain proportions of individuals with low myopia were also shown to have pathologic retinal changes, indicating that there is no safe threshold level for such changes to occur.[7] Controlling the progression rate by at least one diopter during childhood can reduce the risk of developing myopic maculopathy by 40% and mitigate the long-term burden related to the direct and indirect costs of myopia.[8]

At present, there are various interventions available for managing myopia, including optical, pharmaceutical, lifestyle (behavioral) modifications, and more recently light therapies.[9,10] Although clinicians understand the existence of both the problem and the necessity for myopia management, the current challenge for clinicians is the lack of guidelines that would help them in determining when and how to initiate myopia management. Due to this, a lot of eye care practitioners still prescribe single-vision lenses to progressive myopes despite the scope for controlling the same. While there is no "one-size-fits-all" approach to myopia management, standardized guidelines to eye care professionals are necessary to provide or cater efficient myopia control care to many who are in need. On that front, we propose the IMPACT guidelines (Identify true myopia, Mapping the risk factors, Pick progressive myopia, Appropriate treatment strategy, Consult, counsel, combine and monitor regularly, Taper and cessation of treatment), a six-step systematic approach that is simple and easy to apply in any myopia practice for controlling the progression of myopia [Fig. 1].

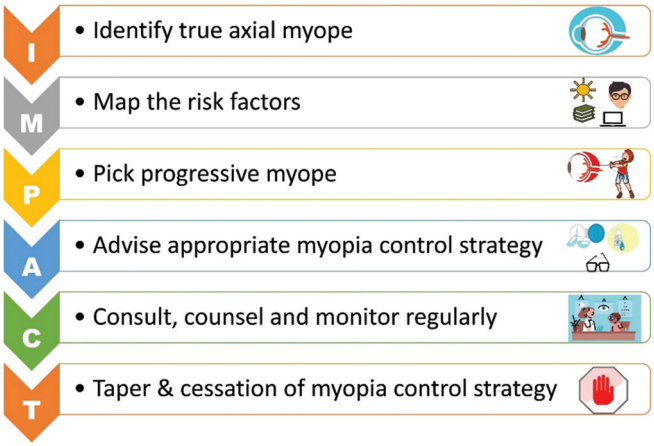


**Figure 1:** The IMPACT myopia management guidelines (six steps) for controlling myopia progression

The IMPACT guidelines were developed and validated through three stages. The first stage involved a thorough literature review of various peer-reviewed research papers on myopia-related risk factors and management strategies. This

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was followed by multiple small group discussions involving clinical ($n$ = 3) and research ($n$ = 4) optometrists, each with at least two years of experience in the field of myopia clinical practice and research. In this stage, the group finalized a list of six fundamental steps discussed below. During the second stage, multiple group sessions were held with a focused group of ophthalmologists ($n$ = 6), optometrists ($n$ = 4), scientists ($n$ = 2), and a doctoral scholar ($n$ = 1) with varying levels of experience in the field of myopia. The experts provided feedback on the guidelines and suggested revisions/additions which improved the clarity of the six steps of the IMPACT myopia guideline. The comments that received wider agreement were incorporated into each step. The final stage involved presenting the guidelines to a wider audience of approximately 200 individuals, mostly clinicians with a few researchers, at the 3rd (annual) Indian Myopia Awareness and Research Conference held in November 2022 (https://imarc.lvpei.org/). Their opinions were then compiled to determine if they agreed with the guidelines and to reach a consensus among the larger scientific group.

### Step 1: Identify True Axial Myope

The very first step requires ruling out refractive and other secondary myopia through methods such as cycloplegic refraction, keratometry readings, and/or axial length measurements. For instance, a situation with a steeper corneal curvature and shorter axial length often indicates higher degrees of myopia. Obtaining accurate keratometry readings along with axial length measurements can aid in the differential diagnosis of axial myopia. It is crucial to always correlate refractive error with axial length to ensure the curvatural or pseudo myopia is ruled out before initiating any myopia control management, irrespective of the age or degree of myopia.

### Step 2: Map the Risk Factors

Detailed history related to myopia and holistically documenting multiple risk factors would provide a basis for understanding the factors contributing to the development or progression of myopia. Possible risk factors of myopia are myopic parents, early age of myopia onset, less time outdoors, excessive near work, relative peripheral hyperopia, high lag of accommodation, and esophoria for near.[11] Recording and documenting as many risk factors as possible within the purview of any eye care practice can aid in estimating the risk of myopia progression and in understanding possible triggering factors.

### Step 3: Pick Progressive Myope

Individuals who have progressive myopic refraction and/or axial length are suitable candidates for receiving the myopia control treatment. An increase in axial length of more than 0.1 mm and/or an increase in myopic refraction of 0.50 D or more within a year can be considered as cut-off values to identify an individual with progressive myopia. Clinicians need to recognize that not all individuals with myopia will experience progression, and therefore, they may not require myopia control intervention.

### Step 4: Appropriate Treatment Strategy

Avoid "shooting in the dark" while managing a myope for controlling progression. It is important to accept that every case of myopia is unique; therefore, it is advisable to opt for a tailored management plan which involves considering the risk factors of each patient and then deciding the treatment plan accordingly to counteract those potentially triggering risk factors.

For example, optical myopia control treatment options such as defocus spectacles, multifocal center-distance soft contact lens, and orthokeratology may be suitable for myopes with relative peripheral hyperopia (observed through performing peripheral refraction) as these lenses are mainly meant to induce myopic defocus in the peripheral retina. Bifocals or progressive addition lenses and the extended depth of focus contact lenses may be recommended for relaxing the accommodation in individuals with high accommodative lag or esophoria for near viewing. Low concentration atropine (0.01%) may be considered for rapidly progressing high myopes, and even children as young as 5 years of age.[12] Emphasis should be laid on the short-term benefits and long-term risk of using low-dose atropine for myopia control. Given that myopes need some form of refractive correction through optics, the myopia control option in the form of spectacle or contact lens format wherever applicable might provide better compliance and acceptance subject to the affordability of individuals. While it is best to start with mono treatment to reduce the complexity, in some cases – especially pediatric high myopia with progression – combined modality may be desirable.[13] The decision of which myopia control option to choose should be based on a thorough evaluation of the individual risk factors, as well as consideration of efficacy, affordability, medical condition, and side-effects of each option. Note that how these myopia control strategies work in cases of high myopia and in pathologic myopia is still not clear and caution needs to be applied while making recommendations.

### Step 5: Consult, Counsel, Combine and Monitor Closely

Regular monitoring of myopia control treatment and compliance is necessary after treatment initiation. A follow-up visit should be scheduled atleast for every six months until the myopia progression is under control. After discussion among the group (stage 3), it was accepted that a good treatment effect can be considered if there is a change in axial length by less than 0.1 mm/year or a change in refraction not more than 0.50 D/year. For stable myopes, yearly follow-up visits can be scheduled, but for progressing myopes, regular follow-up six monthly visits are required to monitor the efficacy of the prescribed myopia control treatment. If necessary, the treatment plan can be modified, or alternative approaches can be tried to achieve the desired treatment outcomes.

If the desired treatment outcome is not achieved after one year, combination therapy may be considered for nonresponders or poor responders to have better control of myopia progression. If a myope is on pharmacological management modality, optical strategies can be added, and vice-versa. It is always recommended to advise environmental lifestyle modifications such as increase time spent outdoors, maintain posture, and taking frequent breaks during near-work or digital gadgets usage in combination with both mono treatment and combination treatment.

### Step 6: Tapering and Cessation of the Myopia Control Treatment

It is recommended that the treatment for controlling myopia progression can be continued for at least two years unless there is any complication, and the patient be at about 17-18 years old (typically late teens) before considering cessation or tapering of the treatment. For instance, the appropriate age for cessation of myopia control treatment can be compared to the age at which refractive surgery is usually advised. It is

to be noted that the age at which myopia stabilization occurs varies from case to case, and in few individuals, myopia can continue to progress in early adulthood as well.[14,15]

In addition to the measures previously mentioned for controlling myopia progression, preventing the onset of myopia is also a crucial consideration in clinical practice. The term 'premyopia' is defined as a refractive state between +0.75 D and −0.50 D, with other quantifiable risk factors, including age and baseline refraction, indicating a high likelihood of myopia development in the future.[16] These individuals need to be identified, monitored, and recommended with appropriate treatment options when required. Environmental lifestyle modifications could be advocated as an intervention in these cases.

## Conclusion

The six-step simple and easy-to-apply IMPACT myopia management guidelines are based on the consensus of a large group of clinicians and researchers, and are developed with the input of experts in the field. Given that a sizeable number of clinicians are unaware of when and how to start myopia management, this is our attempt to provide a stepwise framework that can be implemented in clinical practice. The IMPACT myopia management guidelines could serve as an important tool for clinicians to initiate myopia management at varying levels of eye care services. By combining clinical expertise with these guidelines, clinicians can develop a tailored approach to myopia management. Given the increasing prevalence of myopia, and the burden associated with it, the field is rapidly evolving and, thus, regular updates/revisions to these guidelines should be made to reflect new research findings and advances in the treatment modality.

## Expert Panel

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### Conflicts of interest

There are no conflicts of interest.

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