



Author: Dr. Philipp Hessler
M.Sc. Optometrie/Vision Science
CEO Optik Hessler, Erlenbach a. Main,
Germany

Myopia management for pre-myopia

Over the last years, myopia management has become a major focus in the practical work of many eye care specialists. Current management options typically involve contact lenses or atropine. This case report describes the approach taken in a pre-myopic patient.

Initial situation

Cara was 6 years old and in the first grade of school at the time of her first visit.

What brought Cara to her first Myopia Master measurement?

Cara's older sister had been wearing Ortho-K contact lenses for 3 years to manage her myopia progression.

Cara and her mother accompanied her sister to a visit at her eye care specialist. Her mother reported that Cara seemed to have normal distance vision, but she was worried about Cara's tiredness when reading or doing homework. A measurement with the OCULUS Myopia Master was performed to resolve the issue, marking Cara's first step towards management of her pre-myopic condition.

Axial length and refractive results

Autorefractometry yielded values close to 0 D in both eyes. This was backed up by the finding of normal retinoscopic reflexes and a distance visual acuity of 20/20 as determined by subjective refraction. However, when analyzed against normative data her axial length looked very suspicious. Despite the fact that she was currently not showing any typical symptoms of myopia, it was inferred that she would develop high myopia around an expected 6 D by adulthood.

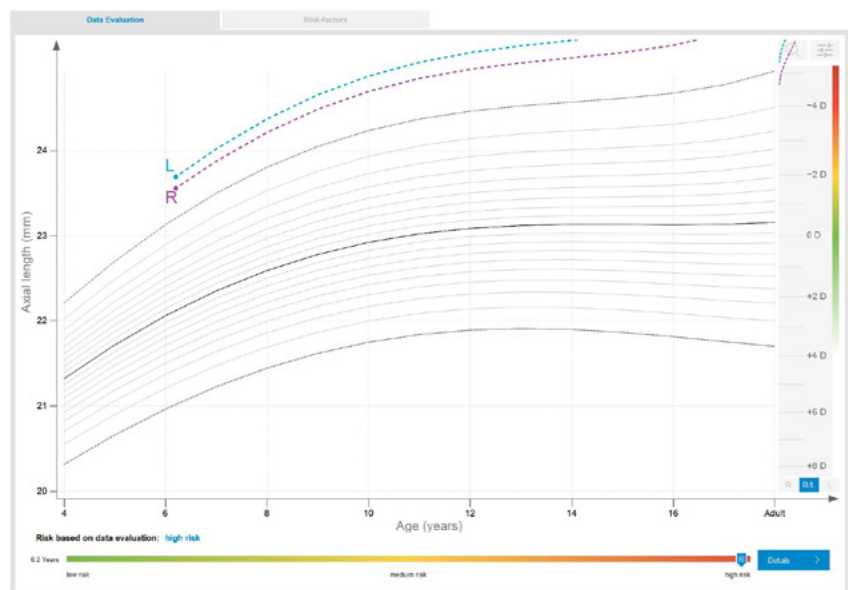


Figure 1: Normative growth curves showing axial length versus age

Risk management

The "Clinical Management Guidelines Report" of the International Myopia Institute (IMI) published in 2019 addresses the term "pre-myopia". It states that hyperopia of more than 0.75 D is normal for six-year-olds. Being emmetropic, Cara showed significantly lower refraction and could therefore be considered pre-myopic.

Genetically, Cara's ethnic background is Caucasian, her father is myopic at -1.50 D and her mother is emmetropic. Further, Cara was spending at least two hours a day outdoors and only about one hour on near-vision activities, not counting school. Taken alone, this information indicated no risk of her developing myopia.

However, it did when viewed in the context of the highly suspicious results obtained in an examination of her accommodation and vergence behaviour when focusing on far and near objects (**Figure 2**).

An examination of her binocular status indicated an excess of convergence as well as insufficient accommodation. These findings were a plausible explanation for her signs of fatigue during near-work activity. Her accommodation and vergence behaviour showed several abnormalities each individually associated with a high risk for development and progression of myopia. The AC/A-ratio, in particular, is considered a strong predictor of myopia progression, especially in pre-myopes.



Author: Dr. Philipp Hessler
M.Sc. Optometrie/Vision Science
CEO Optik Hessler, Erlenbach a. Main,
Germany

Lag of accommodation or reduced accommodation capacity may both have the effect of accelerating myopia. Another reported accompaniment of myopia development is near esophoria.

Treatment

The treatment options for Cara were limited, with Ortho-K being ruled out by her emmetropia and atropine by her accommodation insufficiency. The goal of myopia management should be to reduce all possible risk factors as much as possible. Cara's greatest risks were her accommodation and vergence behaviour. It was therefore recommended to fit her with progressive spectacles with a plus lens addition of 1 D to relieve her near vision. The power addition was calculated by subtracting the normal value (0.5 D) from her lag of accommodation (1.50 D). This solution decreased her accommodative convergence, thereby also moderating her excess in convergence. In addition, she was recommended to have visual training to improve her accommodation ability over the long term. Overall, the above measures helped Cara improve the performance of her visual system. It is hoped / expected that this will secondarily have a moderating effect on the development of her myopia. Since Cara was already spending at least two hours a day outdoors, there was little to optimise in terms of her preferred daily activities. Further recommendations could include providing good lighting for reading and encouraging her to maintain a working distance of at least 35 cm during homework and spend less time with digital media.

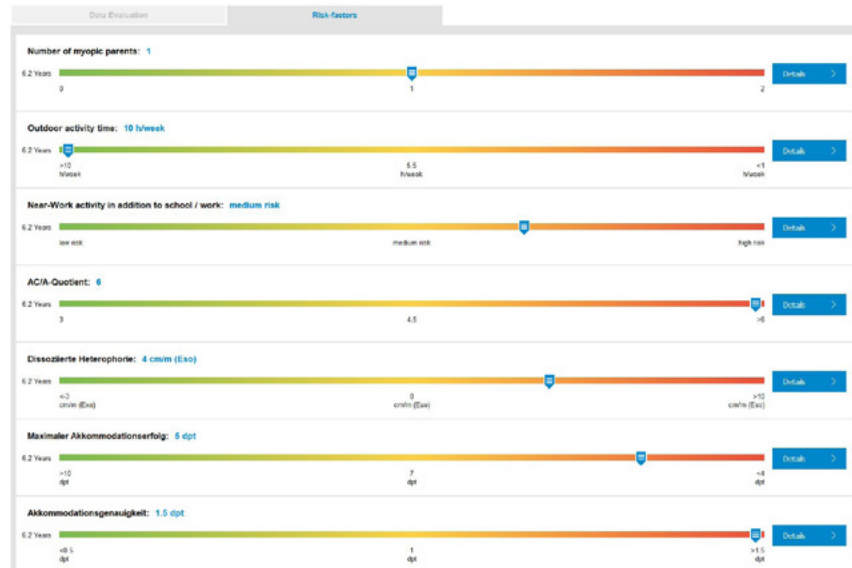


Figure 2: Risk factors detected by the Myopia Master software

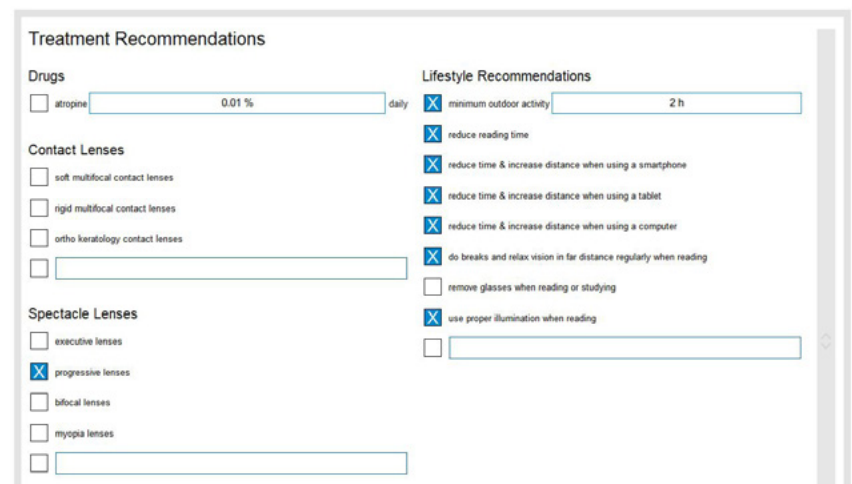


Figure 3: Treatment recommendations for Cara

Conclusion

Pre-myopic cases are not often seen in practice because they usually concern children who have no visual limitations. It is therefore recommended to draw young (myopic) parents' attention to the topic of myopia prevention.

The Myopia Master software assists eye care specialists in identifying risk candidates at an early stage and facilitates communication with parents. This makes it possible to start myopia management when it makes the most sense – as early as possible and preferably before the onset of myopia.