Commentary: Getting off the DESK!

Myopia has been on a steady rise globally over the past half-century and is a silent epidemic. Aside from being a cause of ocular morbidity, it imposes social and psychological impact on youngsters and a substantial economic burden on societies. As we all know, the COVID-19 pandemic has had far-reaching consequences beyond the spread of the disease itself and measures to quarantine it. One of its many evils is the myopia boom seen among children as a result of changes in lifestyle and behavior thanks to school closures and restrictions on social activities.

It has been estimated that the annual expenses for myopia treatment are greater than for other ocular diseases, including age-related degeneration and primary open-angle glaucoma, as also for non-ocular chronic pathologies such as Parkinson’s disease and chronic obstructive pulmonary disease. With the advent of “quarantine myopia,” one can well imagine the burden of visual impairment in the near future. There are several reports showing an alarming rise in both incidence and progression of myopia among school-going children and we, as eye care professionals, are seeing its grave repercussions every day.

Myopia progression in most studies is assessed as mean change in refractive error (in dioptries) and/or mean change in axial length (in millimeters), which, in turn, may not correlate. Hsu et al. classified myopia progression as slow, moderate, or rapid according to an increase in myopic refractive error of <0.50 D, 0.50 D to <1.00 D, and ≥1.00 D over 1 year. During this study, the authors described a mean annual myopia progression of 0.9 D among children aged 6–18 years. According to an extensive literature review by the International Myopia Institute (IMI), greater myopia progression occurs at younger ages (i.e., 0.50–1.00 D/year for 6–9-year olds) than at older ages (i.e., 0.35–0.75 D for those older than 10 years).

Similarly, Wang et al. found that the progression of myopia seemed to be twice higher for children aged 8 years or older. Surprisingly, the authors found that rapid progression of myopia (Change in SE ≥1 D/year) was more in children older than 10 years, suggesting that older children could be spending more hours on mobile for education and/or leisure purposes than their younger peers.

Needless to mention, both increased screen time and reduced outdoor activity are shown to be modifiable risk factors for myopia progression in several studies. During a systematic review, it had been found that prolonged near-work activities increase myopia by 2% for every diopter-hour of near work per week. “Near work” in itself is difficult to quantify and has been defined in several studies as the duration of continuous study time, time spent reading books, number of books read per week, time spent on reading and near work, time spent indoors studying, closer working distance, short reading distance, distance from near work, font size, and screen-viewing activities. However, we need to keep in mind the confounder of lesser outdoor activities, which comes as a rider with more near work!

Smartphones and tablets are ubiquitous and therefore the new paradigm of near work. Moreover, children use these gadgets for prolonged periods and at distances closer than the traditional reading distance. In the wake of the pandemic, longer duration of screen time, online classes, longer hours spent watching television, and playing video games are all pertinent to close work. Chang et al. suggested that reversible accommodative spams during near work as well as permanent structural changes contributed to the greater rate of myopia progression during the lockdown.

A recent study reports that children’s outdoor time decreased from 1.3 to 0.4 h/day, while their screen time increased from 2.5 to nearly 7 h/day during the present pandemic. A similar study reports a myopia incidence of 19.44% over 8-months’ follow-up in COVID-19. There was a progression in SER of −0.50 D and 0.29 mm axial elongation during this period.

Outdoor activities and exposure to natural light are known protective factors against myopia onset and progression. The underlying mechanisms are focused mainly on light exposure and dopamine levels. Faster myopia progression has been seen during the darker winter than the brighter summer months. Nevertheless, outdoor activity should be emphasized because it improves the general health and well-being of youngsters.

As e-learning becomes the new normal, there is an urgent need to accept that myopia may be a public health problem. This may be effective in the intensification of screening in preschool and school-aged children. The role of the ophthalmologist and the parent is to ensure that education and myopia preventive measures go hand-in-hand. Some useful techniques would be to maintain a distance of at least an arm’s length in online classes, reading under adequate illumination, using larger gadget screens and font sizes for better resolution and reducing visual fatigue, ensuring frequent blinking to prevent dry eye, and adopting alternative products such as TV or projectors with relatively longer reading distance. An easy technique is to encourage children to follow the 202020 rule of taking 20-s breaks to see objects 20 ft away every 20 min. A study indicates text size of twice the individual’s acuity is suggested for young, visually normal subjects for sustained comfortable reading from a laptop.

The role of outdoor activity in decreasing the progression of myopia is a proven fact. Children should be encouraged to spend a minimum of 1.5–2 h/day on outdoor activities of their choice. Parents’ supervision and participation in such activities are welcome as is keeping social distancing in mind. They ought to help children cultivate new hobbies as well as explore ways to keep themselves busy by engaging in old-fashioned unstructured play. This helps them to bond and also promotes social, emotional, and cognitive well-being.

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References

1. Zheng Y-F, Pan C-W, Chay J, Wong TY, Finkelstein E, Saw S-M. The economic cost of myopia in adults aged over 40 years in Singapore. Invest Ophthalmol Vis Sci 2013;54:7532–7.

2. Hsu CC, Huang N, Lin PY, Fang SY, Tsai DC, Chen SY, et al. Risk factors for myopia progression in second-grade primary school children in Taipei: A population-based cohort study. Br J Ophthalmol 2017;101:1611–7.

3. Wolffsohn JS, Flitcroft DI, Gifford KL, Jong M, Jones L, Klaver CCW, et al. IMI-myopia control reports overview and introduction. Invest Ophthalmol Vis Sci 2019;60:M1–19.

4. Huang HM, Chang DS, Wu PC. The association between near work activities and myopia in children-A systematic review and meta-analysis. PLoS One 2015;10:e0140419.

5. Chang P, Zhang B, Lin L, Chen R, Chen S, Zhao Y, et al. Comparison of myopic progression before, during, and after COVID-19 lockdown. Ophthalmology 2021;128:1655–7.

6. Zhang X, Cheung SSL, Chan H-N, Zhang Y, Wang YM, Yip BH, et al. Myopia incidence and lifestyle changes among school children during the COVID-19 pandemic: A population-based prospective study. Br J Ophthalmol 2021;bjophthalmol-2021-319307. doi: 10.1136/bjophthalmol-2021-319307.

7. Xiong S, Sankaridurg P, Naduvilath T, Zang J, Zou H, Zhu J, et al. Time spent in outdoor activities in relation to myopia prevention and control: A metaanalysis and systematic review. Acta Ophthalmol 2017;95:551-66.

8. Wu P-C, Chen C-T, Lin K-K, Sun C-C, Kuo C-N, Huang H-M, et al. Myopia prevention and outdoor light intensity in a school-based cluster randomized trial. Ophthalmology 2018;125:1239–50.

9. Hysi PG, Choquet H, Khawaja AP, Wojciechowski R, Tedja MS, Yin J, et al. Meta-analysis of 542,934 subjects of European ancestry identifies new genes and mechanisms predisposing to refractive error and myopia. Nat Genet 2020;52:401-7.

10. Kochurova O, Portello JK, Rosenfield M. Is the 3×reading rule appropriate for computer users? Displays 2015;38:38-43.