



# KEEPING AN EYE ON SMART DEVICE USE

*A guide for parents and teachers to better manage  
smart device use and myopia in children*

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# PREFACE

Setting sights on addressing myopia in children



We live in a globally connected world where, in the palms of our hands, we have access to more information than we could ever hope to need, and where we can communicate with each other from literally anywhere with the push of a button.

The integration of the internet, social media and smart devices into every aspect of our lives has made it easier to do business, to study, to shop and to talk to our friends, and we often wonder how we ever managed without these remarkable technologies.

But as our lives become more about switching on and logging in, we must take a moment to turn off and take a step back, and to look at whether these technologies have negative consequences, particularly for our children.

Our understanding and management of the bad aspects of technology often lag behind our appreciation of and dependency on the good, and this is especially problematic with the emergence of smart devices and the obsessive and often unhealthy way that they are used by young people.

A mounting body of evidence is beginning to expose the dangerous side of smart device

use. All over the world, children and adolescents are becoming hooked on social media, their phones and tablet computers, and an epidemic of health problems is beginning to reveal itself.

Internet addiction disorder is now a globally recognized mental health problem, with millions of children spending up to 16 hours a day glued to their phones. Excessive use of smart devices is causing an increase in rates of depression, anxiety, isolation and cyber-bullying.

As an eye health researcher and the Managing Director of plano®, a technological company that is leading the way by turning the smart device problem into the solution, I am particularly concerned about the damaging effects that smart devices are having on young people's eyes.

We are seeing a global explosion in the number of young people with myopia, commonly known as short-sightedness, with as many as 80-90% of young adults in major Asian cities now having the disorder.



Dr Mo Dirani  
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Research has linked this myopia epidemic, as well as an array of other eye health problems, to excessive use of smart devices and too much time spent indoors during childhood.

The good news is that by teaching children healthy device use habits from a young age, parents and teachers can help to prevent or slow myopia and help them to lead balanced lives.

The worldwide uptake of smart devices marks a huge cultural shift, and we must meet it head on with an opposing shift of equal power. With the right information, this power is in our hands. Unfortunately, most people do not know where to find the right information on myopia and smart devices to empower themselves, with much of the information online being scattered and not science-based.

With that in mind, we have created this guide to provide all the information needed to manage myopia and smart device use. For readers who are interested, this guide contains the most up-to-date science on myopia and smart devices, and this information has been provided in a way that is easy to understand. However, we know that in this busy world, many people would prefer to skip this information and simply want tips on how to protect and help their children to live healthy lives. For that, you may jump ahead to page 14 of this guide.

There is a growing movement of concerned parents and teachers, as well as socially-conscious business people and technology companies who are working together to solve this growing problem. It is hoped that this guide will equip you with the tools to join that movement and keep an eye on children and their smart device use.

*Yours Truly,*  
*Dr Mo Dirani*

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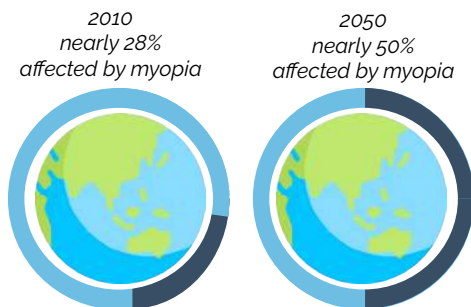
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# THE RISE OF THE GLOBAL MYOPIA EPIDEMIC

*Myopia, commonly known as short-sightedness or near-sightedness, is a disorder of the eye that affects people's ability to see distant objects.*

It is one of the most common health problems, affecting an estimated 2 billion people, or about 28% of the world's population. The number of people with myopia is expected to increase to 5 billion by the year 2050, which will be half of the world's population.<sup>1</sup>



Myopia affects people of every age, gender and race in every country. However, some countries have been affected more than others.

Developed countries in East and Southeast Asia have the highest rates of myopia in the world. As many as 80-90% of teenagers and young adults in Singapore, Hong Kong and Taiwan, and up to 97% of young men in South Korea have myopia.

Just 60 years ago, only 10-20% of people in Asia had myopia.<sup>2</sup> Myopia has also become more common in Europe and the United States where it now affects up to 40% of people.<sup>3</sup> Treating myopia costs Asian economies \$328 billion every year,<sup>4</sup> with Singapore alone spending \$1 billion annually.<sup>5</sup>



## UNDERSTANDING MYOPIA

### Eyes with normal vision

Incoming light rays are refracted or bent by the curved cornea at the front of the eye. Light rays then pass through the pupil where they are refracted again by the crystalline lens. The cornea and the crystalline lens work together to focus light onto the retina.

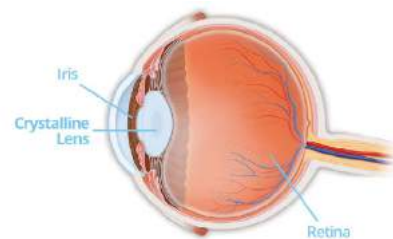


Figure 1: The refractive properties of the eye

Structures in the eye undergo changes throughout a child's development and affect the eye's ability to focus light rays.

These changes include:

#### The eye's axial length

the length of the eye from the front to the back

#### The refractive power of the cornea

the ability of the cornea to bend or converge incoming light

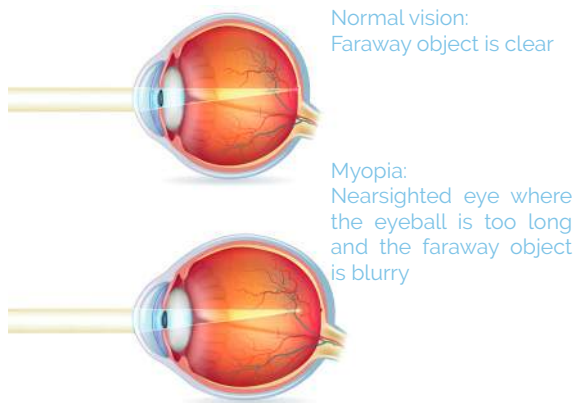
#### The refractive power of the crystalline lens

the ability of the crystalline lens to bend or converge incoming light

These three factors are tightly coordinated by a process called emmetropisation.

Emmetropisation ensures that, as the axial length grows longer, the refractive power of the cornea and lens change so that the eye can achieve a sharp focus on the retina.

### Myopia: longer eyes, shorter focus



**Figure 2. Myopia.** The axial length of the eye is too long, resulting in light rays converging in front of the retina

Emmetropisation is a delicate process, and if it is disrupted, the balance between the axial length, and the refractive power of the cornea and crystalline lens may be mismatched.

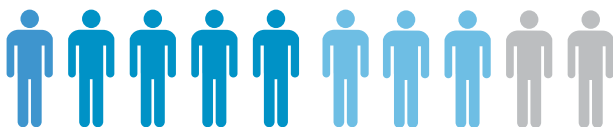
If the axial length of the eye grows too long, light rays focus in front of the retina instead of onto the retina. This results in blurred vision when looking at distant objects. This is what causes myopia.

### AT WHAT AGE DOES MYOPIA TYPICALLY DEVELOP?

The average age of onset is approximately 8 to 14 years old. In some Asian countries, the age of onset may be as early as pre-school years.<sup>6</sup>



11% of Singaporean children aged 6 months to 6 years have myopia, according to the Strabismus, Amblyopia, and Refractive error in young Singaporean Children (STARS) 2009 study.<sup>7</sup>



Rates of myopia are as high as 50% by primary school and 80% by the end of secondary school. The average age that myopia stops progressing is around 16 years.<sup>8</sup>

### HOW IS MYOPIA DETECTED?

Myopia is usually diagnosed by an optometrist in school children based on the results of an eye and vision examination. Guidelines for when examinations should occur differ between countries and age groups.<sup>9, 10</sup>

In pre-school years, parents and teachers are unlikely to be aware that children might be developing myopia since they are rarely required to perform tasks such as reading from a board.

Children may only complain of poor vision long after myopia begins to develop. Routine eye examinations should be done to screen for myopia at the following time periods:



#### 6 TO 9 MONTHS OLD

Infants cannot cooperate with examinations that use vision charts, and techniques called auto-refraction or retinoscopy are used to screen for myopia.



#### 3 TO 3.5 YEARS OLD

Children in this age group can take an examination based on a vision chart, but they may also have their eyes examined with auto-refraction.



#### SCHOOL-AGE YEARS

School age children should have an eye examination yearly, as this is the period in which myopia typically begins to develop.

Parents or teachers may notice that there is a problem with the child's vision if they are unable to clearly see objects such as text on a board in class or television from a distance.

Children may position themselves closer to televisions, computers and classroom whiteboards and may squint to see more clearly.

If the child complains of vision problems or if the parent or teacher notices these behaviours, a vision test should be performed.

# MYOPIA TREATMENT

## HOW IS MYOPIA TREATED?



### SPECTACLES

Spectacles have concave lenses that focus light rays entering the eye onto the retina. They are the most common myopia treatment. Children who experience progressive myopia need to undergo regular eye tests and have new lenses made as their prescription changes. Regular spectacles do not slow the progression of myopia.

For some children whose myopia progresses rapidly, an optometrist may recommend using special lenses such as bifocal, multifocal and progressive lenses to try to slow the progression of myopia.<sup>11</sup>



### CONTACT LENSES

Contact lenses are thin lenses that are placed directly onto the surface of the eye. Like spectacles, contact lenses direct incoming light onto the retina. People usually begin to use contact lenses during their teenage years. Some people with sensitive eyes may suffer from discomfort, soreness, itching and redness of the eye from wearing contact lenses.



### DRUG TREATMENTS

Some studies have shown that the drugs atropine and pirenzepine, when given as topical eye drops, may slow the progression of myopia in children.<sup>12</sup> Very low doses of atropine appear to be safe and have minimal side effects.<sup>13</sup>



### ORTHOKERATOLOGY

This treatment involves wearing a rigid contact lens that puts pressure on the cornea to temporarily change its shape. This treatment was originally designed to slow the progression of myopia, and its use has gradually evolved over time. Orthokeratology requires that patients wear contact lenses overnight.



### REFRACTIVE SURGERY

Lasers are used to reshape the cornea so that incoming light is focused onto the retina. Refractive surgeries are not typically performed until adulthood.



## DIFFERENT DEGREES OF MYOPIA

The level of myopia depends on the focusing or refractive power of the eye and is measured in dioptres, often shortened to 'D'. Myopia is classified into three main types based on severity:

- Low myopia: -0.50D to -2.99D
- Moderate myopia: -3.00D to -5.99D
- High myopia: -6.00D or greater

## HIGH MYOPIA

Most people with myopia have low or moderate myopia. However, around 12% of those with myopia develop high myopia.

People with low or moderate myopia usually do not develop further problems with their eyes and their vision can usually be corrected with spectacles, contact lenses or surgery. People with high myopia are at much greater risk of developing other eye problems because of the more extreme elongation of their eyes.

When other eye problems develop due to high myopia, it is known as pathological myopia or degenerative myopia and it can lead to irreversible blindness even if glasses or contact lenses are used or if surgery is performed. Blinding conditions that can occur because of high myopia include:

### Myopic macular degeneration:

elongation of the eye causes stretching and degeneration of the retina and irreversible blindness.<sup>14</sup>

Myopic macular degeneration is the most common blinding complication of high myopia.

### Retinal detachment:

if the retina is stretched too much, it may pull away from the underlying layer, causing irreversible blindness if not treated quickly.<sup>15</sup>

### Glaucoma:

a disease in which the nerves at the back of eye gradually die.

### Cataract:

clouding of the crystalline lens in the eye.

Cataracts in those with high myopia tend to be very dense.<sup>16</sup>

High myopia is much more common in children who begin to develop myopia at an earlier age.<sup>6</sup> More than half of children who develop myopia before they are 7 years old develop high myopia.<sup>17</sup> High myopia is becoming more common as myopia continues to develop at younger ages. Currently, 4-5% of people, or about 300 million people, have high myopia. Around 10% of the world's population, or almost a billion people, are expected to have high myopia by the year 2050.<sup>1</sup>

# A CASE STUDY OF HIGH MYOPIA



*Local Singaporean, Kevin Tay, aged 33 years, was diagnosed with myopia at the tender age 6 years.*

As a child, Kevin was unfazed by the myopia diagnosis, saying "it was normal, mum and dad wore specs and some of my classmates too. Worsening eye sight was just a normal part of growing up," but visiting the optometrists on an annual basis and realising that his spectacles were getting thicker began raising concerns.

Unfortunately for Kevin, his myopia increased by 5 times (almost 10D in each eye) in less than 10 years. At the age of only 15 years, Kevin had high myopia and without spectacles, he was severely visually impaired.

Kevin's story is all too common both in and out of Southeast Asia, with hundreds of millions of people around the world being affected by this severe form of myopia.

Kevin knew that part of myopia was explained by genetics, but the fact that four of his first cousins on his father's side of the family had no spectacles left him a little confused. Kevin would go on to take up competitive swimming as a teenager, but his contact lens use was becoming troubling.



## GENETIC FACTORS

Myopia is more common and tends to be more severe in children who have parents with myopia compared to children whose parents do not have myopia.<sup>6,8</sup>

Studies on twins showed that if a person has an identical twin (meaning they have exactly the same genes) with myopia, they are much more likely to also have myopia.<sup>18</sup>

These findings show that to some extent, myopia is caused by genes that are passed down from parents to their children.



## ENVIRONMENTAL FACTORS

There are people who develop myopia even though their parents and siblings do not have myopia, suggesting that non-genetic factors play a role.

This has become more obvious in the last few decades, as cases of myopia have been increasing at a very rapid rate, indicating that environmental changes are driving this increase.

Research has begun to shed light on what these factors are, and they include too much time indoors, near work, screen time and bad posture.<sup>19-21</sup>

When asked about the implications of myopia as a young active kid, he recalls "it was inconvenient especially doing sports. I couldn't see clearly during my Judo training, so I had to squint always. Swimming was fine, but it was tough reading off the wall clock for my lap timings; I needed goggles with prescription. When I did equestrian, my glasses would slip when I started to perspire."

His desire to rid himself of spectacles and contact lenses led him to undergo refractive eye surgery at the age of 26 years.

Although he now enjoys very good vision, Kevin is mindful of the future risks to his vision and is taking precautions, as

he says, "even after LASIK vision correction, there is still a fear of future deterioration of vision. I am more conscious of my screen time and habits and try to avoid situations of prolonged focus."

Kevin says he is also taking precautions to ensure his son who is one year old has the best chance of being spectacle-free, adding, "so far, my son seems to have good eyesight and is able to spot even tiny things on the floor. I hope he takes after his mother genetically, who has perfect uncorrected vision. In today's highly urbanized society it is important to also ensure that he gets enough quality time outdoors."





# WHAT CAUSES MYOPIA?



## 1. TOO MUCH TIME INDOORS

Children who spend less time outdoors tend to get more severe myopia and they also develop myopia at an earlier age.<sup>22</sup>

One major reason why myopia is more common in Asia than other parts of the world is that children in Asia spend less time outdoors.

Children in Australia spend 14 hours a week outdoors while Singaporean children spend just 3 hours outside per week, and this has contributed to myopia being 9 times more common in Singaporean children.<sup>23</sup>

Spending too much time indoors means children's eyes do not have enough exposure to sunlight and are not able to focus on distant objects; both very important for ensuring that the axial length of the eye does not become too long.

Light levels indoors are not as high as they are outdoors, even on a cloudy day.<sup>22</sup>

BY LIMITING CHILDREN'S EXPOSURE TO NEGATIVE ENVIRONMENTAL FACTORS FROM AN EARLY AGE, PARENTS AND TEACHERS GIVE THEM THE BEST POSSIBLE CHANCE OF



## 2. NEAR WORK

When children repeatedly spend extended periods of time on near tasks including reading and writing, the axial length of their eyes increases to allow them to focus on nearer objects at the expense of distance vision.<sup>24</sup>

One study found that children aged 7 to 9 years who read more than 2 books per week were 3 times more likely to develop myopia than those who did not read books.<sup>25</sup>

Children who spend more time engaged with near work also tend to have myopia that progresses more rapidly.<sup>23, 26-28</sup>



## 3. SCREEN EXPOSURE AND SMART DEVICE USE

Smart device use and screen exposure cause the axial length of children's eyes to grow abnormally long to adapt to looking at nearer objects more, and they become less able to see distant objects.

Research in China, Japan and Spain has linked inappropriate smart device use to myopia.<sup>21, 29, 30</sup>

## A GENE-ENVIRONMENT INTERACTION

It is now widely accepted that both genetic and environmental factors play a role in myopia.<sup>31</sup> People who have certain genes are at greater risk of developing myopia.

When they are exposed to certain environmental factors, such as too much near work and not enough time outdoors, these factors work together to cause and worsen myopia.

The fact that environmental factors play a large role in the progression of myopia provides parents and teachers with an opportunity to protect children's vision.

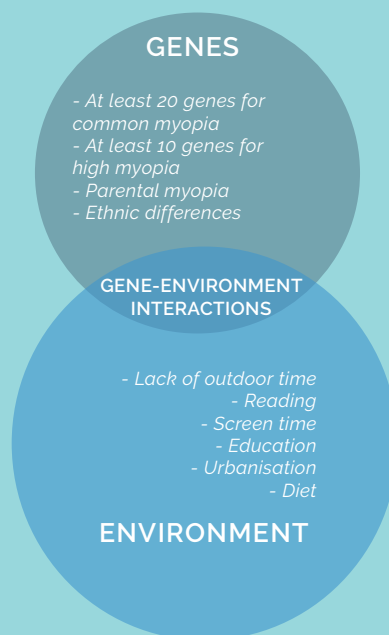


Figure 4. Myopia is a complex disorder that arises from a combination of genetic and environmental factors

# SMART DEVICES IN THE MODERN WORLD

## DEVICE UPTAKE IN CHILDREN WORLDWIDE

One of the major environmental risk factors that is having a growing impact on both the eye health and general health of young people is the recent increase in the use of smart devices.

More than 80% of households in the United States have tablet computers and smart phones. On average, Singaporeans own 3.3 internet-connected devices.<sup>32</sup>

CHILDREN AGED 4 YEARS OR YOUNGER USE MOBILE DEVICES - 97%

CHILDREN AGED 4 YEARS OR YOUNGER OWN MOBILE DEVICES - 75%

CHILDREN BELOW 1 YEAR USING MOBILE DEVICES - 50%

As many as 97% of children aged 4 years or younger use mobile devices. Three quarters of children already own mobile devices by the age of 4 years and almost half of children below the age of 1 year use mobile devices daily.<sup>33</sup>



## SMART DEVICES AND EYE SYMPTOMS



The use of smart devices for long periods causes a range of eye symptoms, particularly in children and adolescents, because their eyes are still developing and vulnerable.<sup>34</sup>

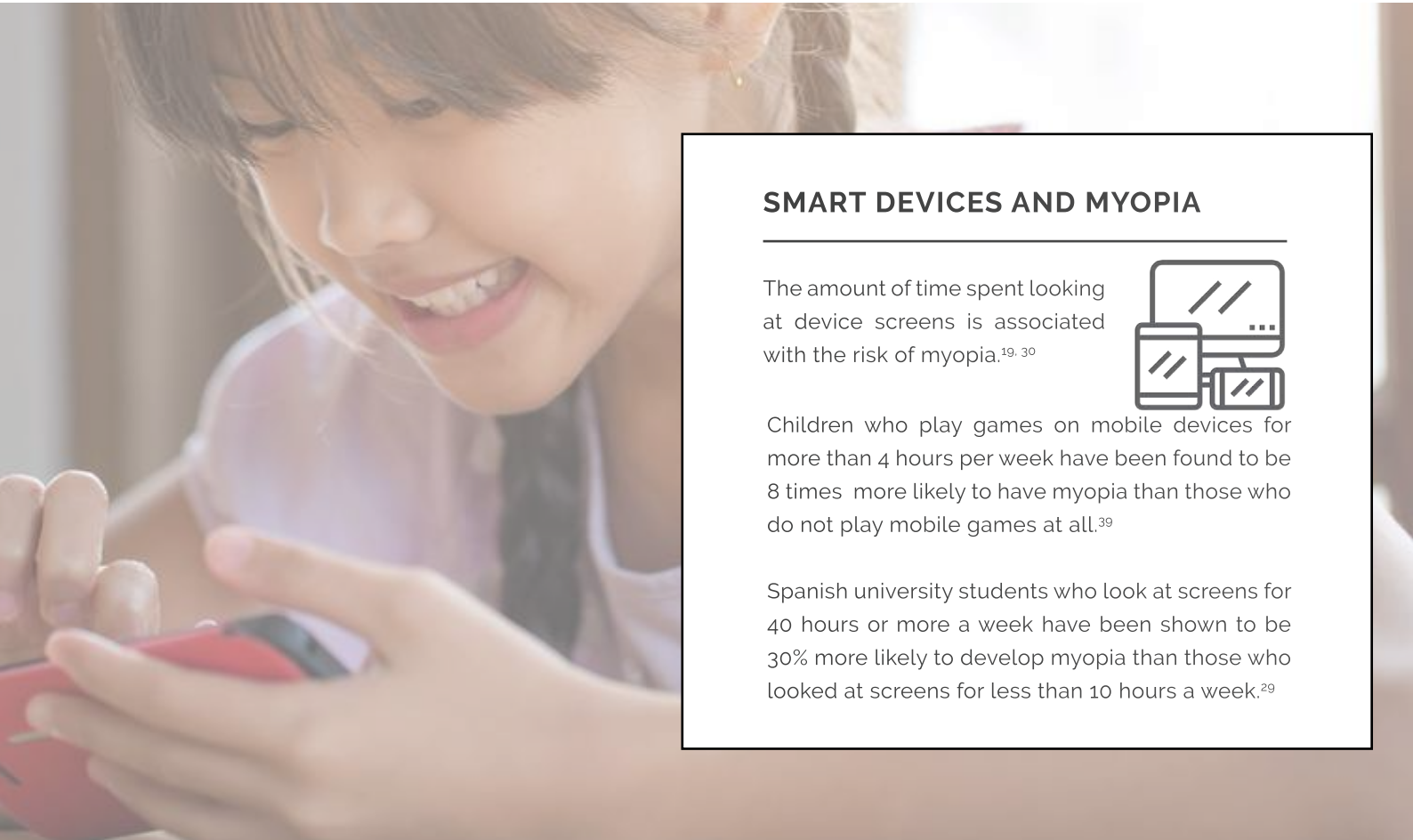
Some of the eye problems commonly caused by smart device overuse include:

### 1 EYE FATIGUE

Looking at screens for extended periods of time causes eye exhaustion and fatigue.<sup>35</sup>

### 2 EYE STRAIN

As many as 50-90% of people who work on screens develop eye strain. Eye strain causes headaches, double vision and an inability to focus properly.<sup>36, 37</sup>



## SMART DEVICES AND MYOPIA

The amount of time spent looking at device screens is associated with the risk of myopia.<sup>19, 30</sup>



Children who play games on mobile devices for more than 4 hours per week have been found to be 8 times more likely to have myopia than those who do not play mobile games at all.<sup>39</sup>

Spanish university students who look at screens for 40 hours or more a week have been shown to be 30% more likely to develop myopia than those who looked at screens for less than 10 hours a week.<sup>29</sup>



### 3 INFLAMMATION

Using smart devices for more than 2 hours a day can almost double the risk of eye inflammation in adolescents.<sup>34</sup>

### 4 DRYNESS

People tend to blink incompletely when they stare at screens, and this can cause dryness of the eyes. Using devices for 8 hours per day can double the risk of developing dry eye disease.<sup>38</sup>

### 5 WATERING

Adolescents who use smart devices for more than 2 hours per day double their risk of having uncomfortable and excessive eye watering.<sup>34</sup>

# OTHER ADVERSE OUTCOMES OF EXCESSIVE DEVICE USE



## INTERNET ADDICTION DISORDER



Smart devices are becoming a major health problem because of the amount of time that children and adolescents spend on them. Almost 90% of adolescents in Hong Kong and Singapore use smart devices every day. In Singapore, children aged 9 to 12 years spend up to 50 hours a week on their smart phones or tablet computers.<sup>40</sup> Some children use devices for more than 16 hours a day.

Children and young adults are especially vulnerable to the addictive potential of mobile devices, the internet and social media. Research using brain imaging has shown that internet addiction causes physical changes in the brain that are similar to those caused by drug addiction.<sup>41</sup> Internet Addiction Disorder (IAD) has become a recognised mental health problem according to the World Health Organization.<sup>42</sup> Those with IAD experience cravings and obsessive urges to use the internet. Rates of IAD and social media addiction are high in most urbanized societies. As many as 34% of Chinese university students are addicted to the internet, and in Korea, IAD has been identified as the largest health problem experienced by children.<sup>42</sup>

Internet addiction in children has become so widespread that hundreds of internet addiction boot camps now operate around the world to help children to detox from their obsessive internet use. There are more than 250 internet addiction boot camps in China alone.<sup>43</sup>

## EFFECTS ON EMOTIONAL & SOCIAL HEALTH



Longer screen time is associated with poorer parent-child relationships,<sup>44</sup> aggressive behavior, social withdrawal, depression and anxiety.<sup>42, 45</sup> A study that looked at more than one million teenagers in the United States reported that since 2012 there has been a large decrease in psychological well-being amongst high school students and that this is strongly linked to screen time.<sup>46</sup>

Children who spend more time online are also at greater risk of cyber-bullying, sexual harassment and victimisation, which can cause mental health problems, and in some cases, even suicide.





## EFFECTS ON ACADEMIC PERFORMANCE



Children and adolescents often prioritize spending time on their smart devices over school or academic obligations, resulting in poor academic performance.

## EFFECTS ON POSTURE



People tend to slouch and bend their heads down and forward when they spend long periods of time on smart devices. This puts pressure on the spine and can cause pain. The pain and other problems arising from poor posture have become so common that experts have named it 'text neck.'<sup>47</sup>

Children and teenagers with text neck have rounded shoulders, tenderness, stiffness, soreness and weakness in their neck, back and shoulder muscles, as well as reduced neck mobility. Some people may experience temporomandibular joint dysfunction which is a very painful condition that affects the jaw.

Excessive use of smart devices can also cause pain and damage to the fingers and wrists from repetitive strain. The more time a child or adolescent spends on smart devices, the more severe and long lasting these symptoms become.





# TIPS FOR MANAGING TIME OUTDOORS, DEVICE USE, AND MYOPIA IN CHILDREN

*Smart devices usually cause problems only when they are used in excessive and unhealthy ways.*

When they are used in a healthy manner, smart devices empower young people to seek knowledge and to improve their critical thinking.<sup>49</sup>

By supporting a healthy and balanced lifestyle with time spent outdoors away from near work and devices, good posture, proper device management, and regular eye check-ups, parents and teachers may protect children from the onset and progression of myopia, as well as the other problems caused by device use.

Of course, getting kids to use their devices in a healthy way is easier said than done. A balanced, fair, but firm approach is needed that can be tailored to the personality and temperament of the child.

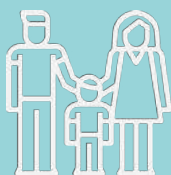
## LEAD BY EXAMPLE

Parents play an important role in modelling healthy device behaviours.

Research has found that 'technoference', or technology-based interruptions in parent-child interactions affect the way children view and use devices.<sup>48</sup>

Simple acts can include things like putting devices away while driving, during mealtimes, or while having conversations.

Parents can even try 'unplugging': have a box where everyone can leave their devices for at least an hour each night, to turn the home into a device-free zone.



## ENSURE CHILDREN SPEND TIME OUTDOORS



Ensuring that children and adolescents spend time outdoors is one of the most important things you can do to slow the progression of myopia.

Some schools have started to include mandatory outdoor time in their curriculum with promising results. One school in Taiwan managed to halve the number of new myopia cases just by making sure that children took their recess outside of the classroom.<sup>50</sup>

Some have even extended break times to increase the amount of time children spend outside. Schools in China have built transparent glass classrooms so that even when children are in class, they can be exposed to natural light and look at objects that are far away.

These holistic approaches that include reduced device time and more time outdoors are starting to reduce the burden of myopia. In Singapore, the National Myopia Prevention Programme (NMPP) has reduced the prevalence of myopia in children by 5% in 5 years.<sup>51</sup>

## REGULAR EYE CHECK-UPS

It is important for children to undergo regular eye examinations so that if myopia begins to develop, it can be managed properly with the help of a healthcare practitioner such as an optometrist.

For children who have already begun to develop myopia, it is important for them to have regular eye examinations to monitor the progression of their myopia. Their vision may deteriorate quite rapidly, and their current spectacles may not provide enough correction to ensure that they can function properly socially and in the classroom.



## BETTER MANAGE CHILDREN'S SMART-DEVICE USE

It is important to set clear boundaries and enforce them. This can include daily time limits, limits on the types of programs and apps that children can use and monitoring of face-to-screen distance.

For younger children who have not grasped the concept of time, other benchmarks such as one episode of a cartoon or one level of a game can be more relatable. It is important to explain the potential consequences to the child if the rules are broken to minimise later conflict. If the rules are broken, parents must be prepared to follow through with the consequences, such as confiscating the device.

Exposure to the blue light emitted from smart device screens at night time causes disruptions to sleep.<sup>52</sup> Therefore, children and adolescents should not use smart devices for at least one hour before bedtime, and they should not use devices at all when they are in bed.

Smart devices and other reading material should not be used in the dark as this can lead to eye strain. To avoid eye strain, brightness on devices should be adjusted to the lowest level at which the screen can be seen clearly, and text size should be large enough to be easily read from 30 cm away.



## EMPOWERING CHILDREN

Parents can empower children to make healthy choices about their smart device use by involving them in the rule-making process.

Parents and children can work together to write a 'device usage contract' that clearly states the agreed-upon rules for their device use.<sup>53</sup> These could include clauses like no smartphones at the dining table or no screen-time after 8pm. Children can be more motivated if they have a say in how they accomplish a goal.

Creating a device usage contract together also keeps the channels of communication open. For older children, explaining the health benefits of limiting device use will also increase their motivation to follow the rules.

## MAINTAINING GOOD POSTURE

Maintaining the correct posture while using smart devices will help to alleviate text-neck and muscle soreness.

It is recommended that children should not tilt their necks more than 30 degrees downward while using their smart devices.

Children should sit upright in a chair that permits both feet to rest flat on the floor. The upper back and neck should remain straight, but still in a comfortable position.

If children are seated at a table, at least one fist should fit between the child's chest and the table.<sup>21</sup>

## FACE-TO-SCREEN DISTANCE

Some young people may hold devices too close to their faces which causes eye strain and increases the risk of myopia.

There is no guideline on the exact distance that all devices should be held as the face-to-screen distance varies depending on the size of the screen and the size of the text that is being read. Although reading distances may vary, a good distance to hold devices from the face is between 30 and 35 cm.<sup>54</sup>

## INSTALL PARENTAL CONTROL SOFTWARE

These apps help to monitor the child's device usage and can be an important filter for the type of content that they access.

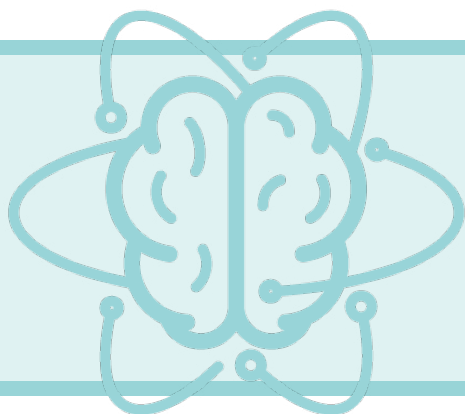
Features to look out for are parental time controls, app and browser blocker, as well as remote locking (if necessary).

## plano®: TURNING THE PROBLEM INTO THE SOLUTION



### AN EMPOWERING, ALL-ENCOMPASSING PARENTAL MANAGEMENT APP

There is good evidence for the health benefits of proper device use. However, even as adults we sometimes find it hard to set limits for our own device use. It is even harder to expect young children to regulate their own device use. In a busy world where parents and teachers are not able to constantly monitor children and their device use, a reliable technological solution that is built into the devices they are using is needed.



plano® is an empowering and all-encompassing parental management app developed to manage smart device use and myopia in children worldwide.

The features and functions of plano® have been developed based on cutting-edge technology, science and market research to produce an excellent user experience.





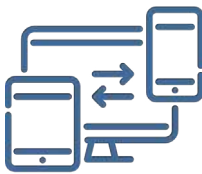


plano®'s functions encourage positive behavioural change to promote better eye and general health, create a safe smart device environment and enable optimal parental management.

Ultimately, plano® is not a policing app, but rather a friend of the family.



plano® has many functions that assist in ensuring that children use their devices in a healthy way:



The app allows parents to control their child's device use from their own smart device.

The app also sends a notification to the child to instruct them to take a break from their device and to spend more time outside.



The app monitors the child's device use in real time and sends notifications to parents to inform them when a device is being used excessively.

The app also detects posture and distance of smart devices from the child's face and notifies them to change to a healthy posture and face-to-screen distance.



When children engage in healthy device use, plano® rewards them with points that they can use to send a wish list to their parents of items from plano®'s partner vendors online through the plano® shop.

## TAKE-HOME MESSAGES



Myopia is caused by excessive elongation of the eye and an inability to focus light from distant objects onto the retina. It affects up to 80-90% of young people in some countries.



High myopia is a severe form of myopia. It affects 12% of people with myopia and can cause irreversible blindness.



Onset of myopia is typically in childhood, and earlier onset often results in more rapid progression and higher rates of high myopia.



Myopia is caused by a combination of genetic and environmental factors.

The biggest environmental factors are a lack of outdoor activity and excessive near work.



Parents and teachers are in the best position to help children reduce the negative effects of device use and the risk of myopia.



Excessive device use causes eye disorders and psychological and physical health problems and contributes to the myopia epidemic.



# Best practices when using devices:



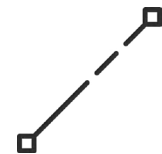
Spend 2 to 3 hours outdoors every day.

Children under 2 years should not use smart devices at all.



Empower children to make healthy device use choices.

Hold devices a safe distance from the face.



Go for regular eye check-ups. (annually).

Better manage smart device use by children.



Limit device use into small time blocks, with the total of all blocks not exceeding 2 hours per day.

Set a good example.



Ensure good body posture when using devices

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## plano® mobile app



plano® has a number of functions to ensure safe and healthy smart device use in kids, with key features supported by evidence-based science.

Get started using plano with 4 easy steps!

# 1. Download

Download plano® for FREE!

Download for iOS: <http://apple.co/2y8Kiwu>

Download for Android: <http://bit.ly/2hdo2g>



# 2. Register

Click on 'register' and enter email address and password!

# 3. MDM Profile

iOS users will need to install Mobile Device Management profile as required by Apple to allow you to supervise your child's device.



# 4. Add Child

Click on 'add child' and enter name, DOB and eyesight details

## **plano®, your smart device friend.**

plano® mobile app has a number of functions to ensure safe and healthy smart device use in kids, with key features supported by scientific evidence.

Now available on the App Store and Google Play.

For more information, please visit [www.plano.co](http://www.plano.co)

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