

The Lock Down Syndrome.

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Introduction:

The COVID 19 pandemic is causing some major challenges in our everyday activities and certainly changed our world for the foreseeable future and maybe even over the long term. To reduce physical contact and create some social distancing children and adults were encouraged and even forced to stay at home. The whole working environment has changed. People are now working from home spending long hours on digital devices. Most of my patients report that they are spending far more time on these devices than what would have been the case if they were working from their offices. It is also common practice not to get in your car or even on an aeroplane to go and attend meetings or seminars but rather sit at home attend virtual meetings or webinars. One year ago, most of us did not even now about Zoom meetings or webinars.

Our children are finding them in the same situation. E-learning has become common practice and even now with children and students that returned to school or institutions of higher learning it is still part of a new approach to teaching in many institutions. The result of this is that most of us are spending far more time on near point tasks than ever before. [This is creating havoc on our visual systems. Again, it is our children that are bearing the brunt of this. Good and comfortable vision is essential in all reading and writing tasks. With the lockdown](#) parents were reporting to me that [children are now spending up to 12 hours per day looking at I PADS or cell phones. They are engaged in e -learning and then communicate with their friends on social media](#) and were also allowed to [play games on their screens](#) or watch movies on their smart phones.

I recently had a meeting with someone that is contracted to a Medical Aid to look for trends in the claims that they receive from members and practitioners. He discovered that in the last year, approximately 25% of all claims were associated with stress related conditions and it costed the medical aid a whopping R2,5 billion for the year. It simply confirms my opening statement that this pandemic has affected many people in a severe way. The impact that I have seen on the visual system of adults and children prompted me to even call it the Lock Down Syndrome. Although the basic mechanisms and principles are the same, I will deal with adults and children separately.

The Lock Down Syndrome in Adults:

Most of what I am seeing in adults is associated with what we know as concepts such as **Computer vision syndrome (CVS)** and **Visual Fatigue Syndrome (VFS)**. This is old news and goes back to the 1990's but what has changed is the dramatic increase on time spend on these devices. Research shows that between 50% and 90% of people who work at a computer screen have at least some symptoms [1]. But most vision experts say we can rest assured, if we apply common sense rules then there is really nothing to be concerned about [2]. Herein lays the problem since many people are now forced to stare at a computer screen for hours at a time. Add

to this the introduction of many new applications on hand- held devices such as tablets and smart phones and 3D screens and common-sense flies out of the window. [3]

The point here is that we spend a great deal of time on any given day staring at some type of visual screen, whether for work or entertainment. This not only applies to working adults and students, but also the children. The large computer screens are bad enough, but now we are also using much smaller visual screens with smaller displays, and not well-formed lettering (fewer pixels). This is placing even greater strain on the eyes and visual system [2,3]. Thus, the question remains: How does all of this affect our eyes, and is it detrimental to the visual system? It is not that simple to answer because it does not refer to one specific problem but may include a whole range of visual problems.

CVS and **VFS** are considered to be similar to other repetitive motion injuries, such as carpal tunnel syndrome [1]. Working on computers involve continuous focus and refocus as well as tracking and convergence activities. The eyes need to constantly adjust to changing images on the screen to allow the brain to process what you are seeing. All these jobs require a lot of effort from your extra ocular as well as ciliary muscles. And to make things worse, unlike a book or piece of paper, the screen adds contrast, flicker, and glare. Computer work gets even harder as we age and reach presbyopia.

General signs and symptoms associated with the use of handheld devices and computers [1].

- Headaches
- Eye Strain
- Fatigue
- Burning, Itchy, Red and Watery Eyes
- Loss of Focus
- Blurred Vision at near and at distance [NITM]
- Double Vision
- Neck/Shoulder Pain
- Sensitivity to Lights (Photophobia)

Headaches, Eye Strain and Fatigue are mostly associated with squinting and repetitive ocular muscle actions. Burning, Itchy, Red and Watery Eyes results mainly from staring at a screen. The result is a significant reduction in blink rate causing evaporation of the tear layer and a subsequent dry eye. This seems to be the most common symptom reported by patients. Add to this that quite often we work in places that are running air conditioning and the dry eye only gets worse, more so for people wearing contact lenses. Loss of focus and blurred vision at near relates to fatigue in the accommodative system [1,2,3].

Double vision relates to a fatigue in the convergence system [more so in people with significant phorias] and because of the near triade [convergence, accommodation and pupil response] often appears with blurred vision and photophobia. Neck and shoulder pain simply results from poor posture [2]. There are also studies that suggest electronic devices give off high-energy, short-wavelength, blue and violet light, which may affect vision and even prematurely age the eyes. Early research shows that overexposure to blue light could contribute to eye strain and discomfort and may lead to serious conditions in later life such as age-related macular degeneration (AMD). There is no real hard evidence and a recent scientific report out of coming

out of the US concluded that “there is no scientific evidence that blue light from digital devices causes damage to your eye.”[4] but “blue light coatings” is becoming common practice.

The most concerning aspect that I am seeing in adults during this Lockdown is a major increase in blurred vision at distance. Patients are complaining that it becomes more obvious and severe towards the end of the day. This phenomenon may be a little bit more complex than we think. The literature suggests that this is the result of a short-term myopic far point shift immediately following a sustained near visual task. Overall, studies reported myopic shifts, with a mean of approximately 0.40 D and a range from 0.12 to 1.30 D. While the precise aetiology remain unclear, I am quite convinced that this can evolve in a more “permanent” myopia and that this is a significant factor in the global increase in myopia. What I find most concerning is the fact that I now find an increasing number of patients that ends up with low myopic scripts. Most of them are in the age group of 35 to 45 years of age. The reason for them seeking advice is the fact that they are now finding that their symptoms seem to increase rather than decrease. The phenomenon itself is not new and searching the literature you will find reports on what is called, pseudo myopia dating back to the 1970’s when Susan Stenson and Richard Raskind published a paper on the aetiology, mechanisms and therapy for pseudo myopia [5]. Pseudo myopia is, as the name implies, an apparent myopia and refers to a spasm in the accommodative system. It is characterized by a tonus in the ciliary muscle caused by constant accommodative effort. Pseudo myopia may, according to Duke Elder [6] have other causes as well and although the concept is still around later research has come up with a new concept called near work induced transient myopia [NITM]. It should be obvious that this concept deals specifically with the relationship between sustained near work and myopia. The big question is can pseudo myopia and NITM turn in to permanent myopia? Based on converging evidence from clinical, laboratory and modelling studies Kenneth J. Ciuffreda and Balamurali Vasudevan [7] produced a five-fold argument for a possible link between permanent myopia and NITM. This just not apply to adults only but certainly to children as well. A statement just released by the Brian Holden Vision Institute in Australia, stated that a recent study monitoring 123,000 children annually in China, found an increased prevalence of myopia in children aged six to eight years in the year 2020, compared to previous years. [8]. UNICEF joined in by warning about the negative effects of screen time during the COVID pandemic [9].

If in doubt about the aetiology of this reduced distance vision, the obvious thing to do would be to perform a cycloplegic refraction. Otherwise, the safest option would be to rather reduce the near point strain and do not be surprised if, in almost all cases, distance vision is restored within a week. We recently celebrated International Myopia Awareness Week to make the public and ourselves more aware of the dangers associated with myopia and therefore it is disappointing to see how many of us would simply provide myopic scripts without considering the consequences. Sadly, research out of Australia indicates that globally only 13% of eye care practitioners are practicing myopia control or prevention. If we do not take this seriously then this major increase in myopia would be our biggest setback during this COVID 19 lockdown.

The Lock Down Syndrome in Children:

Since Sue Palmer published her book called *Toxic Childhood in 2006* [10] numerous publications, appeared on the dangers associated with excessive use and exposure to handheld devices. Apart from all the social and psychological challenges today's children are also facing significant physical deprivations. During Lockdown children were forced to remain indoors and physical activities got replaced by an increase in "screen time". Too many parents it was an easy way out to try and keep their children occupied. Many parents were also obliged to assist their children with all their e-learning activities. In this process a good number of parents discovered certain symptoms in the children that would otherwise not been detected. [This sustained near work activities were now causing tremendous near point strain on the visual system](#) resulting in several symptoms and or frustrations.

Broadly speaking the child's visual system may respond to this stress situation in several different ways and more so in young children that is still in the process of developing all the near point visual skills and visual-motor integration.

- Those children that acted diligently and tried to make the best of the E-learning environment began to [complain about reduced distance vision](#). This is the same NITM that we see in the adult population. With children it seems to manifest itself more severely and even earlier. [8] All the arguments regarding myopia prevention and control are certainly just as applicable in children. I am seeing to many young children that already ended up getting low myopic scripts. All of them having non-myopic parents. [This is the worst solution](#) if we wish to take myopia prevention and control seriously. [In a week I saw 4 such cases that I needed to reverse. Giving these glasses will just increase the strain at near](#) and is a sure way of establishing permanent myopia.
- Sensory development takes place in the "first 1000 days" of a child's life. Although this process continues after that, it becomes far more difficult. The lack of exposure to proper sensory activities may impact on the whole development of such a child. Research is showing an ever-increasing number of children lacking in this critical development. [11]. The result of this is that we are seeing far more children presenting with reading, writing and learning difficulties once they enter a formal schooling system and need various kinds of therapy. Sadly, many of them also ends up with labels such as ADD. The significant increase in time spent on near point activities during Lockdown made parents become aware of how their children were struggling to complete basic learning and reading activities. The ADDITUDE Website in the USA reported an increase in the number of children presenting with ADD and ADHD symptoms during the Lockdown.
- [Acute acquired comitant esotropia \(AACE\)](#). In 2016 Lee *et al.* [12] reported on this unusual presentation of esotropia in children using smartphones for more than four hours per day. In my own practice I have seen an ever-increasing number of children between the ages of two and six years over the last year presenting with AACE related to the excessive use of handheld devices. Working on video display terminals was shown by several authors [13,14] to induce abnormalities in accommodation and vergence, when compared to ordinary hard copy work. Therefore, the authors [12] conclude that it is conceivable that excessive use of handheld devices at close reading distance and the resultant abnormalities in the accommodation and vergence systems of children with low fusional divergence capacity, can lead to dynamic preponderance

of the medial rectus muscles, resulting in the development of manifest esotropia. I have dealt with this phenomenon in detail in a separate publication [15].

- [Other children will find reading and learning much more difficult and may present with several symptoms because of this strain resulting in learn and read frustrations. As stated above it is important that the eyes should be able to remain comfortable together at near \[convergence\] and be able to focus comfortably at near \[accommodation\] for extended periods. If these two systems are not functioning optimally, the eyes will find it difficult to tract properly and smoothly across a page. The solution is to relieve the strain on the convergence and accommodative systems, and this would result in an immediate improvement in the visual system. I am deeply concerned that we may create another pandemic with the difference being – this one can be avoided.](#)

Guidelines for use of electronic devices.

In line with a more holistic approach in dealing with visual problems our emphasis should be to prevent rather than cure [or compensate]. In addition to the risk of computer vision syndrome, visual fatigue syndrome and myopia, we should be aware of the concerns that excessive use of hand-held devices may have on our general everyday life. Several organisations have now reviewed the current scientific literature about this and published a number of guidelines to minimise the effect on the visual system [2,3].

1. Try mix of tasks throughout the day. People should take frequent breaks from computer use and take part in a variety of activities that involve postural changes and physical movement. Performing sedentary tasks using electronic media (computer use, watching TV, texting, etc.) should be accompanied with regular breaks. To be safe we should take a 60-second break every 20 minutes and at least 10 minutes after two hours of staring at a screen. Because dry eyes seem to be the most common symptom, people should be encouraged to blink regularly, especially if they wear contact lenses. Tear supplements will also work wonders, but the dry, irritated eye actually serves as a good warning sign that it is time for a break. This is even more important in young children where session should not last longer than 30 minutes, followed by a 5-minute break. While E-learning is still the order of the day, parents should really try and limit the time spend on screens for non-educational purposes.

2. Encourage the use of proper postures when working at a desktop computer. Workstations should be designed to suit the user's size and enable a range of suitable postures. Feet should be able to rest comfortably on the floor; desk height should be at elbow height; document holders should be used to position paper materials near the computer screen. The screen should be below eye level [20 cm] because it is much more comfortable and less strenuous looking down.

3. Encourage a comfortable working distance i.e., Harman's distance for all hand-held devices and at least 50cm for desk top screens. The closer the screen the more strain there will be on the accommodative and convergence systems resulting in double vision and/or blurred vision. If possible, increase the font size and adjust the screen resolution and contrast. Again, our children tend to hold cell phones or even I-pads awfully close to their face and parents should manage this very strictly to prevent the kind of problems referred to above.

4. Ensure that proper lighting is provided. Distant or frontal light can cause a great deal more glare off screens, which makes focusing even more challenging. If possible, use ambient overhead lighting which provides good results. The screen should also be positioned and angled to avoid glare. And remember to clean your screen occasionally!

5. Teach yourself computing skills, including how to touch type with minimum force and how to use keyboard shortcuts to reduce mouse use.
6. Although the use of “computer glasses” is considered to be ineffective and controversial by some researchers, I have no doubt that they work well in reducing several symptoms. I also believe that they prevent NITM and even proper myopia. From my own experience single vision lenses works far better than multifocal or low plus lenses [+0.50]. As a rule of thumb add +1.00 to the distance script to obtain the required power of the lenses.

Conclusion.

Computers and handheld devices will dominate our lives for the foreseeable future and dealing with these signs and symptoms effectively will greatly enhance the ocular health of your patients. From my own experience I have little doubt that we will experience many more visual abnormalities related to the excessive use of handheld devices. It is not strange any more to see babies sitting with these devices. You can now also buy baby strollers with the bracket for a handheld device attached to it. Exposing children to these devices in the first two years of life when the visual system is still developing neurological and physical pathways will have serious consequences not only on the visual system but also on perceptual and neurological development. Parents must be made aware of the fact that instead of giving their children an advantage as they hope, they may just achieve the opposite. Several countries in the world are now looking at introducing mental health policies to protect their youth against excessive use of handheld devices [12] and are also developing so called Smartphone addition scales (SAS). Managing the time spent on these devices should form the cornerstone of any approach, not just for children but even for adults.

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CPD QUESTIONS AND ANSWERS

[answers marked in yellow]

1. The Lock down brought about by the COVID pandemic:
 - a. Resulted in a life- style change in many people.
 - b. May have a major impact on our visual system.
 - c. Resulted in an increase in stress related diseases.
 - d. All of the above
 - e. Only b and c

2. The Lockdown impacted on:
 - a. Adults only
 - b. Children only
 - c. Adults and children.
 - d. Only c
 - e. Only a

3. Lockdown resulted in an increase in time spend on near point devices:
 - a. False
 - b. True

4. The visual system may experience the following signs and symptoms:
 - a. Headaches
 - b. Burning, Itchy, Red and Watery Eyes
 - c. Visual Fatigue
 - d. Loss of Focus
 - e. Double Vision
 - f. Only b and c
 - g. All of the above

5. Blurred Vision at near and at distance is not associated with CVS or VFS.
 - a. True
 - b. False

6. Research shows that blue light emanating from electronic devices:
 - a. May affect vision and even prematurely age the eyes.
 - b. Require spectacles with “blue light coatings”.
 - c. Is not enough to cause damage to the eye.
 - d. Only a and c
 - e. All of the above
7. Blurred vision resulting from visual fatigue would:
 - a. Be more pronounced towards the end of the day.
 - b. Only affect adults not children
 - c. Always be present.
 - d. All of the above
8. Studies reporting on myopic shifts following a sustained near visual task:
 - a. Found it to be insignificant.
 - b. Reported it to be as much as 1.30 D.
 - c. Indicates that this phenomenon has been around for many years.
 - d. Only b
 - e. Only b and c
9. Pseudo myopia is, as the name implies:
 - a. Refers to a spasm in the accommodative system.
 - b. It is characterized by a tonus in the ciliary muscle caused by constant accommodative effort.
 - c. May have other causes as well.
 - d. All of the above
 - e. Only a and b
10. Pseudo myopia and NITM can turn in to permanent Chinese eye exercises:
 - a. True
 - b. False
11. Pseudo myopia and NITM is only applicable to:
 - a. Children
 - b. Pre-presbyopes
 - c. Students
 - d. All of the above

12. Near work induced transient myopia is different in children than in adults.
- True
 - False
13. Lack of Sensory Development in first 1000 days of our life will:
- Impact on the whole development of such a child.
 - Cause children to present with reading, writing and learning difficulties.
 - Require various kinds of therapy.
 - Only a
 - All of the above
14. AACE in children.:
- Can be the result of excessive use of smart phones.
 - Can even happen to 2-year-old children.
 - Can be a dynamic preponderance of the medial rectus muscles.
 - None of the above
 - All of the above
15. Strain on the visual system may result in learning and reading difficulties.
- True
 - False
16. How to limit the near-point strain caused screens and hand- held devices.
- Mix of tasks throughout the day.
Take frequent breaks from computer use.
 - Breaks should involve physical movements of stretching and walking.
 - All of the above
 - Only b.
17. How to limit the symptoms of near-point strain on the eyes, caused by screens and hand- held devices.
- people should be encouraged to blink regularly, especially if they wear contact lenses.
 - Use tear supplements.
 - Increase working distance.
 - Look away from screen at very regular intervals.
 - All of the above

18. For children, the following guidelines should apply:
 - a. session should not last longer than 30 minutes.
 - b. Followed by a 5-minute break.
 - c. Working distance [Harman's distance] is essential.
 - d. Time spend on screens for non-educational purposes is not important.
 - e. All the Above
 - f. Only a and b
19. General recommendations should include the following.
 - a. Encourage the use of proper postures.
 - b. Feet should be able to rest comfortably on the floor.
 - c. The screen should be below eye level [20 cm]
 - d. Ensure that proper lighting is provided.
 - e. Only b and c
 - f. All of the above
20. "Computer glasses" can:
 - a. Reduce the near point strain on the visual system.
 - b. Prevent NITM.
 - c. Prevent many signs and symptoms associated with VFS and CVS.
 - d. None of the above
 - e. All of the above