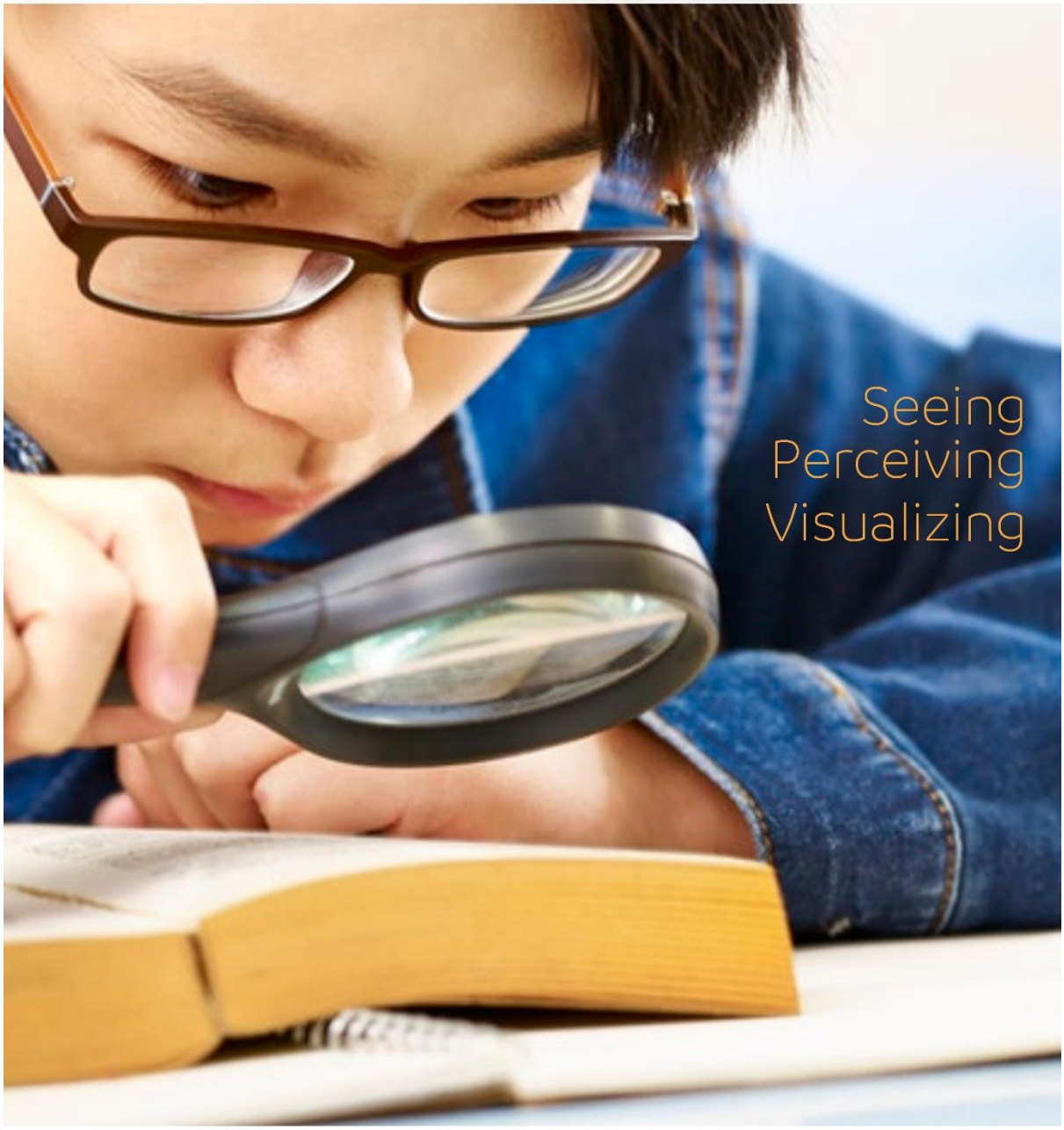
What do

Vision & Integrating Reflexes

have to do with learning?

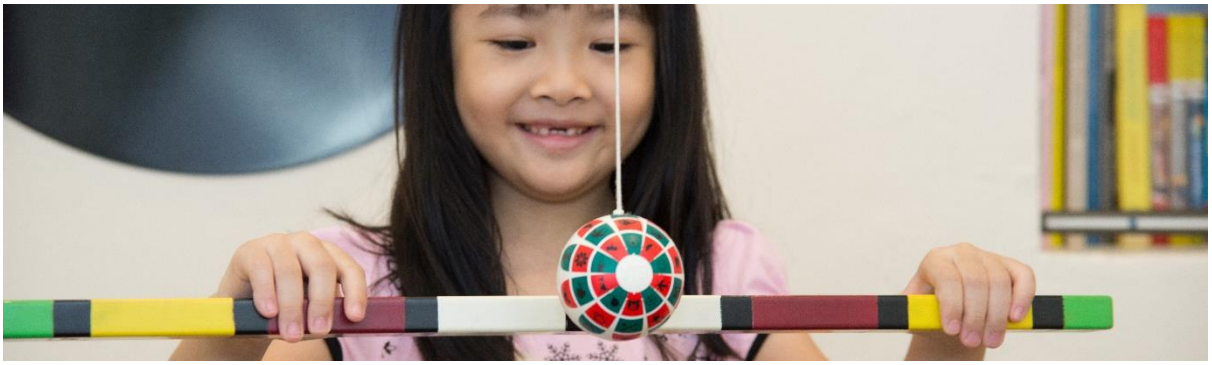


A guide for parents and educators

orthovision
center for intelligent vision

Thank you for your interest in Integrated Cognitive Orthoptic Remediation (Vision Therapy) and for downloading this booklet from our website. The information we share here was put together to help parents and teachers/educators see the crucial link between vision and learning (and of course learning problems).

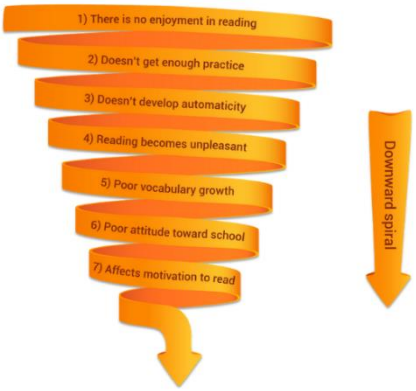
Contents



Introduction

We have created this guide for you because here at Orthovision very often we see children

- who have problems with reading,
- who are challenged at school because it is difficult for them to read and stay focussed,
- who have been going from one therapist to the other,
- who have been given labels,
- who think that they just plainly are 'stupid/slow/underachiever' because they cannot read properly.



These children feel overwhelmed, put themselves under constant stress and are discouraged. [i]

Time and again we are amazed by the results we achieve with Integrated Cognitive Orthoptic Remediation (ICORE), which go way beyond just 'seeing'.

Sometimes already after a relatively short period of time, everyone notices the changes that are happening in these children's lives: they feel more confident, it is easier for them to pay attention, they understand what they read and are becoming better in sports.

So, the changes go way beyond just 'seeing' better. It is about understanding the world around, feeling better as a person, and getting more clarity on life.

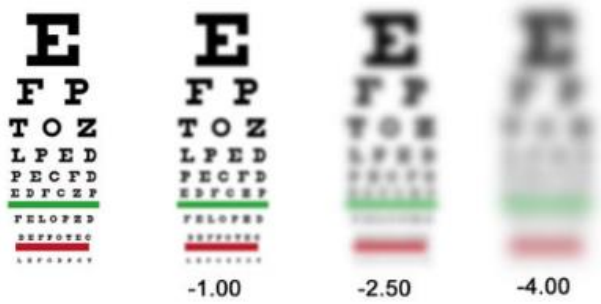
All in all, this is a fantastic upwards spiral to be on - especially for a child![ii]

This is why we hope that through this booklet, we will be able to explain to you

- **why a functional vision deficiency or retained primitive reflexes might be the root-cause for a child's reading and school problems and**
- **how we are here to help you overcome this obstacle**.

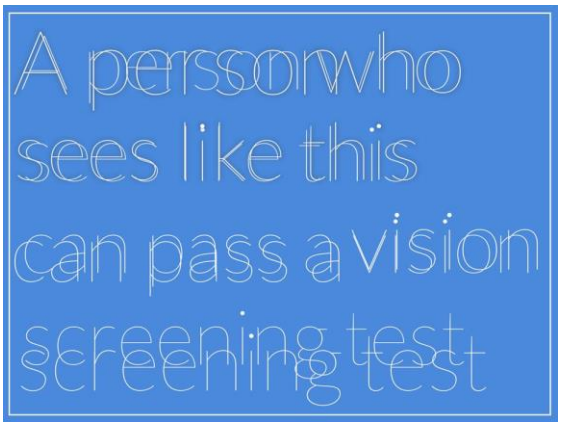
20/20 assessment vs developmental visual cognitive assessment

You might have already checked the child's eyes and a 20/20 vision was achieved (with or without glasses). Like most people, you might be under the impression that 20/20 is enough.

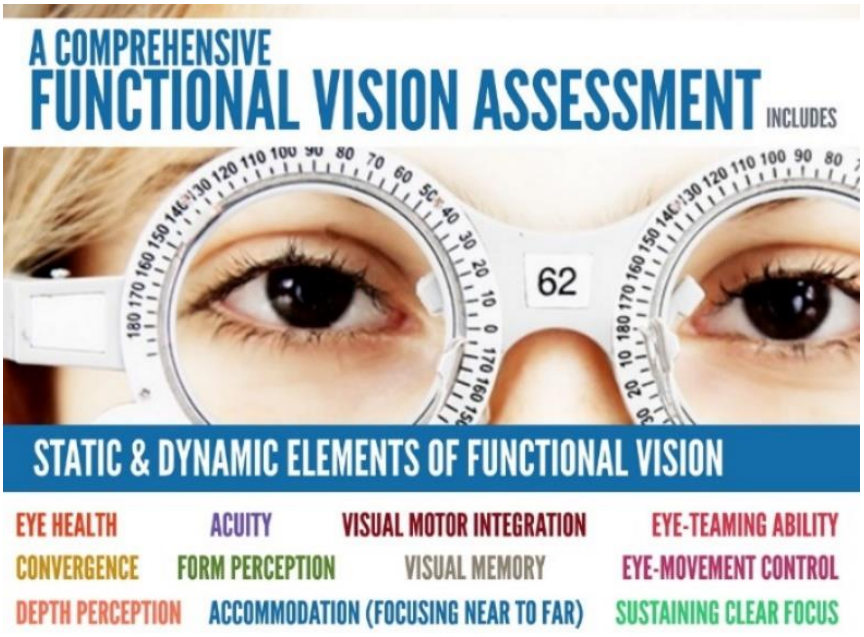


Visual acuity (i.e. 20/20) **measures the clarity of a person's vision**. It is tested by having a person read the letters of an eye chart with **each eye individually**. It does not require the same amount of eye movements that reading does, therefore it is **not sufficient to determine if a child has the functional visual skills needed for reading**.

We encourage you to go to YouTube (https://www.youtube.com/watch?v=EDRfCfnZFNo) and watch the experiment that was conducted with four teachers in Canada. Only one failed the 20/20 test, whereas the other **three passed the visual acuity test although they had much bigger vision problems** (after they were fitted with lenses that distorted their vision the way that many students are seeing). You see, their problems were not that they did not see the letters on the 20/20 line, but that their eyes did not work together as a team!



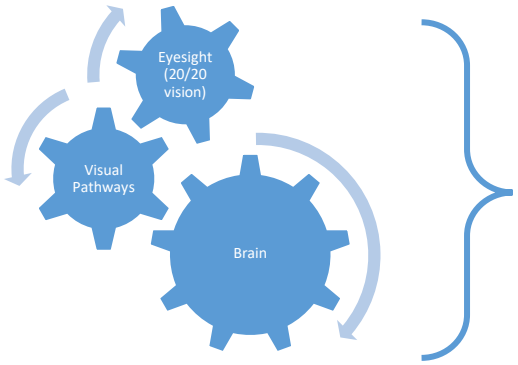
This is what a developmental visual cognitive assessment would pick up!



Double vision, blurred vision, moving words usually is not something the children tell the adults about, because for them this is normal! This way of seeing is what they grew up with – they assume, everyone sees the same way.

Overview about the correlation of vision and learning

In order to have a good vision, several partners have to work together.



Good vision can only be achieved if all these three components work together.

As you can see, the 20/20 vision is only one part of it.

If any one of these three components is 'faulty', the visual processing is compromised. So, **even with a 20/20 eyesight, a person can experience difficulties when reading, writing, or processing information**. And as 80% of the information a child takes in comes through their vision, just imagine what that means if this is not working properly.

Here are some numbers for you:

75-90% of learning in classroom
- is processed from the visual system

1 in 4 children in US has learning problem
- 85% of these have vision-related learning problems

25% of US children have vision problems
- significant enough to affect school performance

95% of first grade nonreaders had vision problems
- They had nearly 2.5 times more visual problems than first grade high achievers.

Only 20-30% of vision problems are detected at schools
- using the school vision screenings (such as Snellen eyechart)

[iii]

Which visual challenges affect learning

So, after having talked about how many challenges with the eyes remain undetected, let's look at which ones they are and how they affect learning!

Poor Accommodation

Symptoms of Dysfunctional Accommodation

- problems copying off the board
- lose place while copying
- sloppy handwriting
- takes more time than others

Accommodation is the ability to **shift visual attention from one viewing distance to another and to keep clear focus**. A majority of school children with learning difficulties (according to some studies up to 96%) will show some form of vision problems, particularly with accommodation.

During a regular school-day a child needs to facilitate accommodation (i.e. to shift focus) to various viewing distances. It is expected that they can do this - it's taken for granted. But **as we see, a very high percentage of the children with learning difficulties are not able to do that activity well.**

Parents are frequently very surprised when children confirm after being asked about the **blurred vision** when looking at the white board and then at the notebook; particularly by the fact that **they forget what they just have seen on the board.**

Convergence Insufficiency

Convergence Insufficiency (CI) is a **very common childhood problem** in which the eyes are not able to sustain a converged position but instead one of them drifts out. Convergence is generally an **eye teaming problem** leaving child with symptoms such as eye strain, blurred and double vision, headaches, loss of concentration, frequent loss of place when reading and trouble transferring the data.

Symptoms of Convergence Insufficiency

- **Blurred Vision**
- **Double Vision**
- Eye Strain
- **Headaches**
- Loss of concentration
- Frequent loss of place when reading
- Trouble transferring data

Many children do not complain of convergence as **they do not know how to verbalise this problem since no one ever spoken to them about it**. On the other hand, parents and educators usually are completely unaware of the issues and therefore in **most of the cases it remains undetected.**

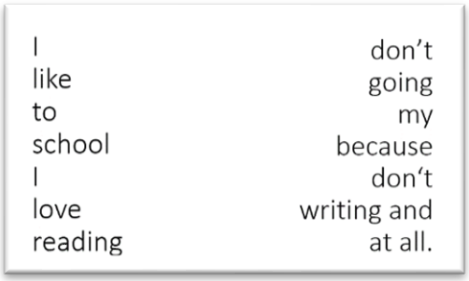
Directionality

We use directionality when interpreting different meanings in similar shapes. For example,

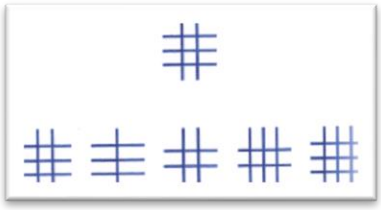
are all the same shape but with different orientations and meanings. **They are often reversed by children with poor directionality.**

Saccades & Pursuits (Tracking) – Dysfunctional Eye-Teaming

In order to learn successfully, focusing on a moving target (tracking) or switching the focusing from one target to the other (saccades) are two essential eye-movements. **Children who have problems with this often lose their place while reading a text or when moving from the end of a line to the next one.**



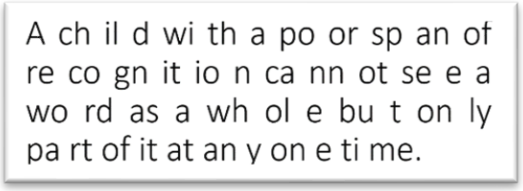
Form Perception



People with challenges in form perception find it **difficult to identify a form from memory, draw/copy a more complicated form**, mix up the direction in which the form is orientated to, identify an incomplete form, a 'mirrored form' or a figure that is partially hidden.

Span of Recognition

People who can read at faster speeds have a good span of recognition, which helps them to recognize and process several words at one time. **Children with challenges in this skill may only see one word or part of a word at one time.** Try reading by looking through a straw and then you know what that feels like and how hard it is.



Visualization

Very often, children who have problems with vision also have **difficulty with visualization**. However, this skill is very important in many school subjects, amongst others math and spelling.

Overview about the correlation of vision and learning

Performance Symptoms

- Frequent loss of place
- Omits, inserts or re-reads letters/words
- Confuses similar-looking words
- Faliure to recognize the same word in the next sentence
- Poor reading comprehension
- Letter or word reversals after first grade
- Difficulties copying from the board
- Poor handwriting / misalignment of numbers
- Book held too close to the eyes
- Inconsistent school and sport performance

Secondary / Behavioral Symptoms

- Short attention span
- Smart in everything except school
- Low self-esteem
- Poor self-image
- Fatigue, frustration, stress
- Irritability
- Temper flare-ups / aggressiveness
- Daydreaming

Potential Labels

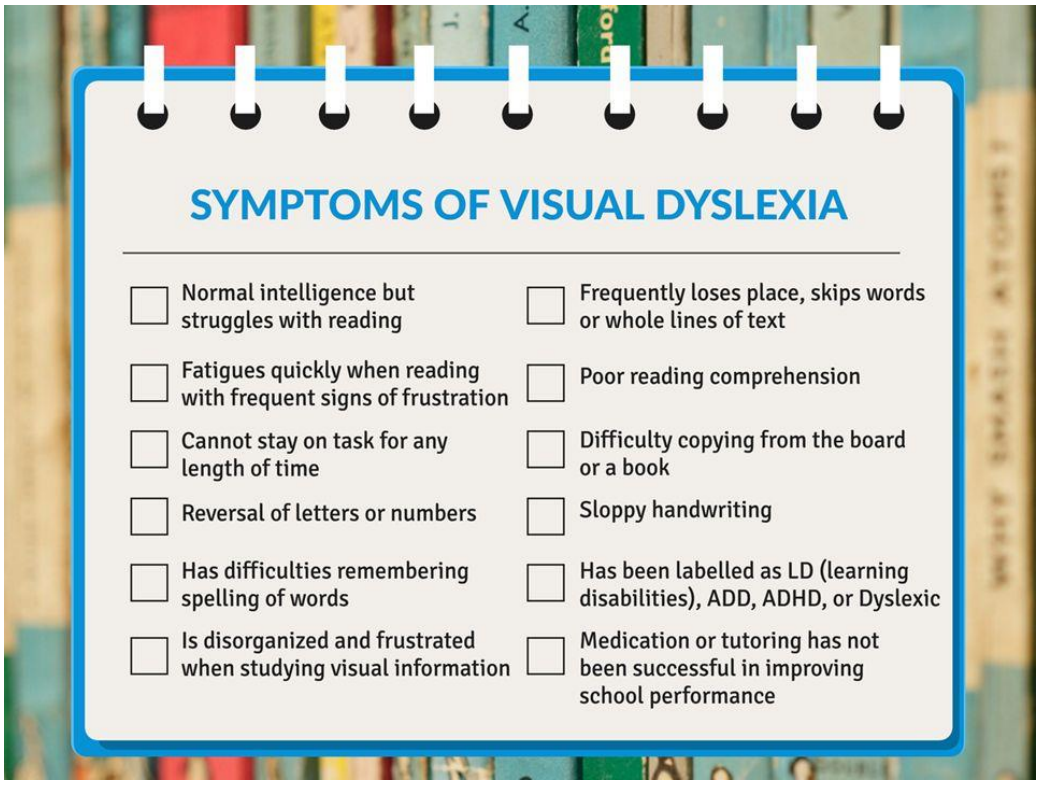
- Lazy
- Dyslexic
- Attention Deficit Disorder (ADD)
- Behavioral Problems
- Working below potential
- Juvenile Delinquent

Visual Symptoms

- **Blurred Vision**
- **Double Vision**
- **Moving Words**

Possible Underlying Visual Causes

- Poor **Accommodation**
- **Convergence Insufficiency**
- **Dysfunctional eye-teaming** abilities
- **Strabismus**
- **Lazy-Eye**
- **Computer Vision Syndrome (CVS)**



How does this impact their school work

Just bearing in mind that 80% of the information we process daily comes through our visual system, naturally a **person with vision problems will have problems processing all that information**! Not just in reading, but in a lot of subjects.

Here are a few examples:

How vision challenges impact MATH

Seeing decimals (where is the 'in a number) or signs (x/+/-) can be very challenging for a child who has trouble making a clear and single image. Furthermore, such a child may find it very difficult write the numbers in lines and nicely organized. In addition, adding numbers in a column is very challenging if the tracking skills are insufficient.

Directionality and laterality are other important concepts in math. Naturally, when a child sees a number incorrectly (i.e. 58 instead of 85), math problems cannot be solved correctly.

Children who have insufficient visualization skills frequently count on their fingers or you hear them whispering. They usually can come up with an answer but need more time than others. Being able to visualize numbers and quantities is very important to be successful in math – and if a child has vision problems, this can influence their abilities in math.

It needs to be noted, however, that not all children with vision problems do poorly in math (math does not require as many precise eye movements as reading does).

How vision challenges impact READING

Vision challenges affect children on two levels

Learn to read – 1st stage

At this stage, a vision challenge **reduces the ability conceptualize what they are looking at** and therefore to **remember** letters and numbers.

Read to learn – 2nd stage

When a child needs to read a lot but has either blurry or double vision, or sees the letters moving, then reading for longer periods of time becomes very tiring. Hence – they find every excuse not to read.

Also, reading and comprehending are two different tasks. **The brain of a child who needs to concentrate so much on the act of reading cannot process the meaning of the words**, let alone remembering them and putting concepts together. This leads to a reduced reading comprehension.

People with vision challenges spend most of their time decoding words, so they focus on each specific word instead of reading fluently and visualizing what they read as a whole. Doing this is a ongoing struggle which makes it difficult to process the content of the text.

Therefore, students often track a text with their fingers, read less fluently and more slowly. Often, they miss words, letters, make up different words or lose the space in the text altogether.

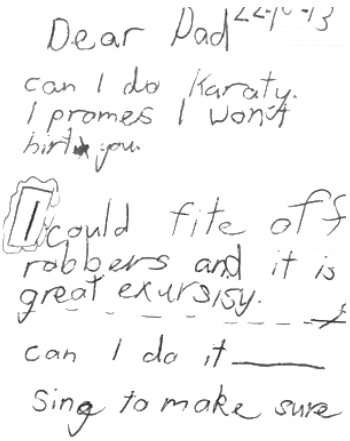
Very often, such reading challenges are interpreted as **laziness – but they are not!** They are simply the symptoms of a (functional) vision problem. Once this is corrected, students often start to enjoy reading instead of avoiding it

If your child does not like to read – does he/she enjoy when you read to them or when they listen to an audio-text? This might be a good indication that they have vision challenges which prevent them to fully enjoy the reading process!

Spelling & Writing

A critical skill for spelling is **visual recall**: the ability to create a visual image based on a past visual experience without having that experience at that moment. So, to be able to form a mental image of a word without actually seeing it depends on this skill.

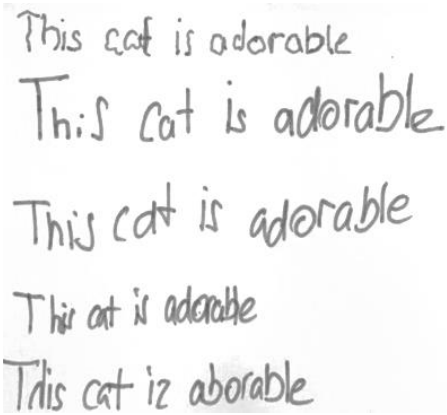
Handwriting: When a student cannot see well, it is difficult to lead the hand for handwriting. You can often see when a child gets tired, stops looking and does not lead the hand anymore. **A child not being able to write on the line** (above and under the line, big letters, small letters, writing upwards etc.) **is an indication of a vision challenge.** We already mentioned the directionality which is needed when deciding how to spell a 'd' (or 'p' or 'b' or 'q')



Composition writing: For a child to write a text, spatial abilities are important to plan how words go together. Visualization is also very important for composition writing as students need to organize and change a composition in their heads.

Examples of handwriting of children with vision challenges

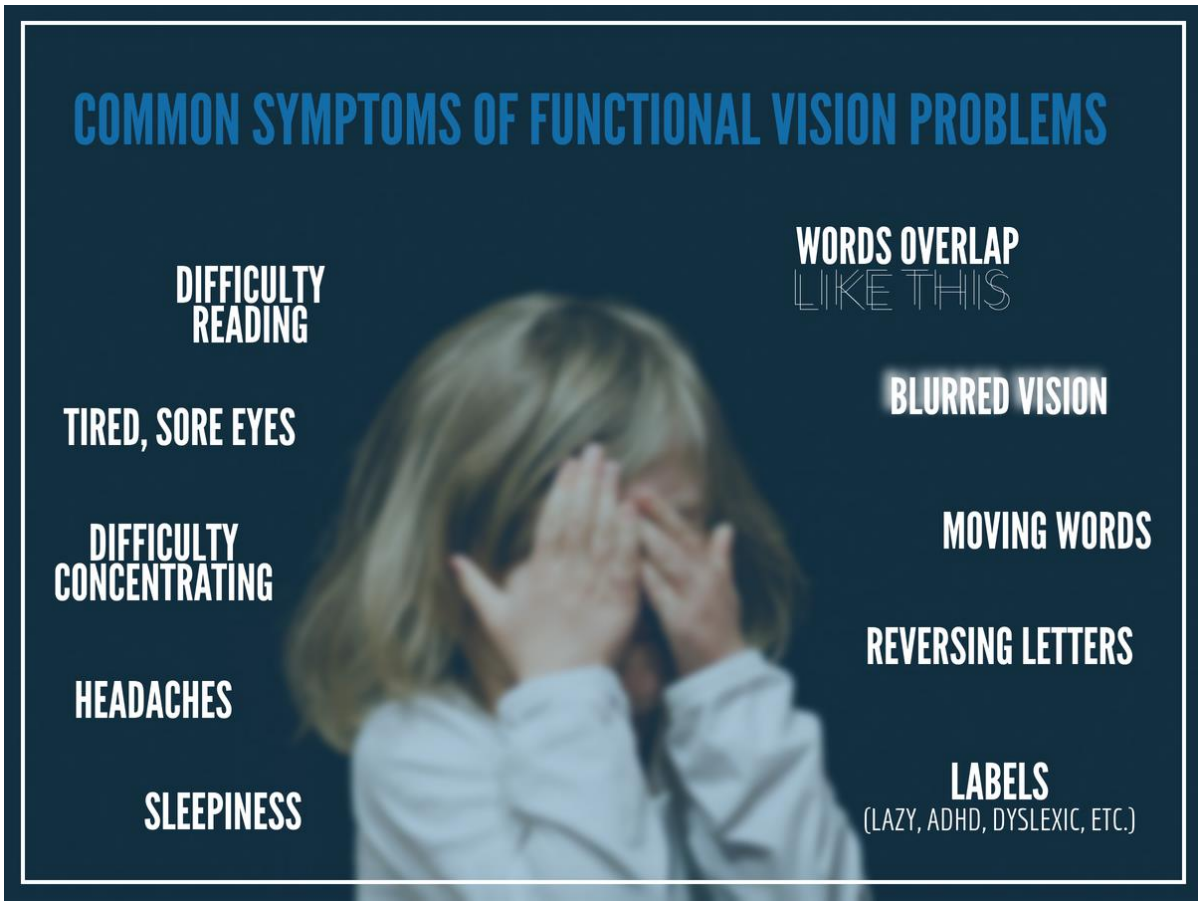
- Shaky words
- Unequal size of letters
- Writing above or below the line
- Words moving or letters running together
- Reversed letters
- Words pushed together
- No concept of space



What causes stress for students

The following are areas that can cause stress for children with vision problems:

- Long periods of near point work
- Small print
- Pages full of print, with blocks of text close together
- Copying from the chalk/whiteboard onto paper
- Flickering fluorescent light
- Fine-motor skills
- Random lists of spelling words
- Standardized test sheets
- Timed tests
- Crossword puzzles
- Reading aloud to others without being given a warning
- Being asked to identify left and right instantly



Take a vision quiz

The below questions help you to determine if you (or your child/student) have a vision problem. Just write in the number that best describes how often each symptom occurs:

0 – never 1 – rarely 2 – sometimes 3 – frequently 4 - always

Symptom	Score
I get headaches from near work	
My eyes are burning, itchy and watery	
I avoid near work	
I have difficulty copying from board	
I like to hold reading material too close to the eyes	
When I read, words run together	
When I read, I skip / repeat lines	
When I read, I tilt my head / close or cover one eye	
When I read, I forget to read (omit) small words	
I have problems with reading comprehension	
My handwriting goes uphill or downhill, big letters, small letters	
I misalign numbers / digits / columns	
I have trouble keeping attention on reading	
I find it difficult to complete assignments on time	
It is hard to use my time well	
I lose my belongings / things	
I am forgetful / have a poor memory	
I like to say 'I can't' before giving it a try	
I act clumsily and knock things over	

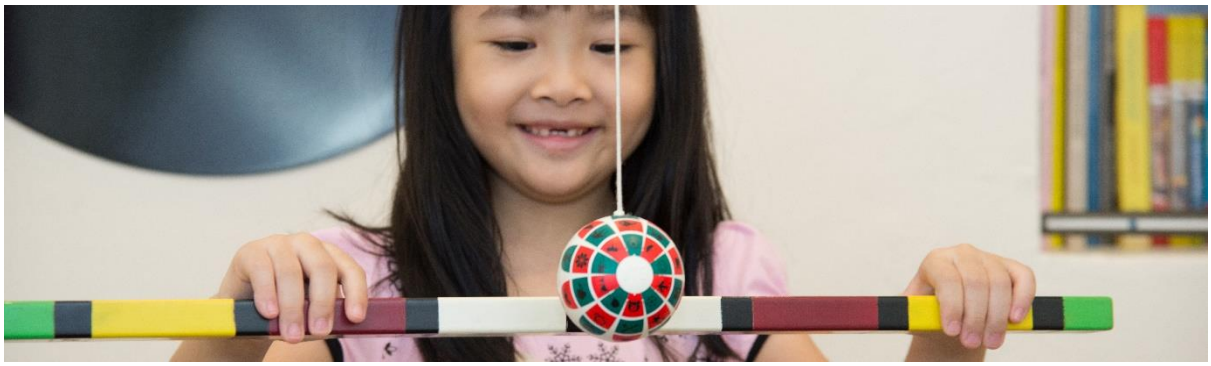
A score of 20 or more points indicates the need for a functional vision exam – and if you have chosen 2 (sometimes) or 3 (frequently) for any of the items, an assessment might be advisable.

A functional vision assessment checks the entire visual system. Based on the findings of such an exam, it may be determined whether Integrated Cognitive Orthoptic Therapy (Vision Therapy) is required.

Vision Therapy – Integrated Cognitive Orthoptic Remediation (ICORE)

What is Integrated Cognitive Orthoptic Remediation?

ICORE helps the patient develop the visual skills necessary for good vision. Different exercises and optical training devices are used to retrain the muscles that control the eye in order to make eye-movements more efficient and easier.



Through the therapy, the patient learns how to correctly process the visual information that the brain receives from the eyes and retrains the muscles. Integrated Cognitive Orthoptic Remediation varies greatly in length depending on each case and usually involves in-house visits and at-home activities. Most programs last about 6-9 months.

Who needs Integrated Cognitive Orthoptic Remediation?

Participants who require Integrated Cognitive Orthoptic Remediation generally have some the following visual challenges:

- **Vision-related learning problems**: challenges with eye-teaming, focusing, tracking and visualization skills can all negatively affect learning.
- **Cross-eye (Strabismus) or lazy eye (amblyopia)**: crossed eyes and/or lazy eyes can be treated with Integrated Cognitive Orthoptic Remediation instead of conventional surgery, glasses, or patching. ICOR is very effective for these conditions at an early age - but good results can also be achieved for patients of other age-groups.
- **Stress-induced vision problems:** With everyone relying on technology, many people spend a lot of time working in front of a computer screen. This is why there is an increasing number of patients that experience eyestrain, headaches, and other visual-related difficulties (Computer Vision Syndrome).
- **Sports vision improvement**: Athletes often use Integrated Cognitive Orthoptic Remediation to improve their eye-hand coordination, visual reaction time, peripheral awareness, eye-teaming, focussing, tracking and visualization skills.
- **Visual rehabilitation**: a neurological disorder or trauma to the nervous system can affect a person's vision. This includes people who have traumatic brain injuries, strokes, whiplash, development delays, cerebral palsy, multiple sclerosis, and other neurological ailments.

What changes after Integrated Cognitive Orthoptic Remediation?

As mentioned above, it is not just 'seeing' that becomes easier – but the world opens up in many ways for people after ICOR.

After successful treatment, our clients usually find that:

- Learning and school become easier
- Their reading level and speed increases
- They spend less time on homework
- Playing sports (especially ball-sports) becomes easier
- They see objects up close or far away better (for example copying from the board at school)
- They can visualize easier

Not all of these improvements happen right away, but progress can usually be noticed already early in the therapy program.

Studies

Please refer to our website http://www.orthovision.com.sg/references for various studies and references.

How can educators modify the classrooms to make it easier?

If you think a student might have a functional vision problem or benefit from Integrated Cognitive Orthoptic Remediation, please communicate with the parents that the vision needs to be assessed not just for 20/20 vision (acuity) but for the functional vision.

Also, in order to help children with vision challenges, please think about modifying the following in your classrooms (please speak with the vision therapist on a case-by-case basis):

- Hand out papers with larger print
- Give the children visual breaks during long near point work
- Whenever possible, ensure that learning materials are well-spaced and well-organized on the page.
- Move student closer to the front of the classroom or place material to be copied on his/her desk to enable proper copying from the board.
- Provide 'fat' pencils and crayons or use special pencil grips.
- If possible, make use of natural lighting and full spectrum bulbs.
- Make students use highlighter markers to help them with reading.
- Give these students more time for timed tests.
- Allow students to have the option about reading aloud to a group.
- Enable kinaesthetic learning.
- Allow students to verbally give answers to tests.

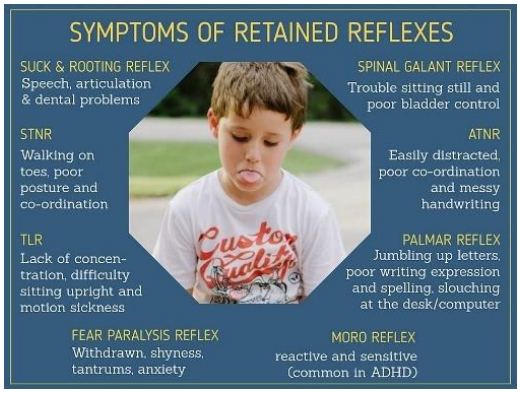
Retained Primitive Reflexes

What are Primitive Reflexes?

Primitive Reflexes form during the gestation period – they protect the foetus, help in the birthing process and aid survival in the first 6-12 months of a child's life. You might have seen the Moro Reflex in action when a baby gets startled and throws the arms back, brings the legs close, takes a breath in and opens the eyes wide.

What are *Retained* Primitive Reflexes?

As a child grows up, these primitive reflexes will be replaced by cortical control and postural reflexes. Basically, that means that the brain will take over and the reflexes are no longer needed. This is called 'the reflexes are integrated'.



If, however, the reflexes are not integrated, then they are called 'retained'. These uninhibited reflexes can interfere with subsequent motor development, hand-eye coordination, perceptual skills, and visual functioning. Difficulty in developing adequate eye control and visual function to assist learning tasks including reading, writing and comprehension can be results. Symptoms of retained reflexes are manifold, some of them can be seen in the picture here.

This physiological basis for learning difficulty can cause frustration and an inability to comply with many of the requirements of a standard schooling experience. It can also interfere with concentration, memory, and perception of information.

How can these Retained Reflexes be Integrated?

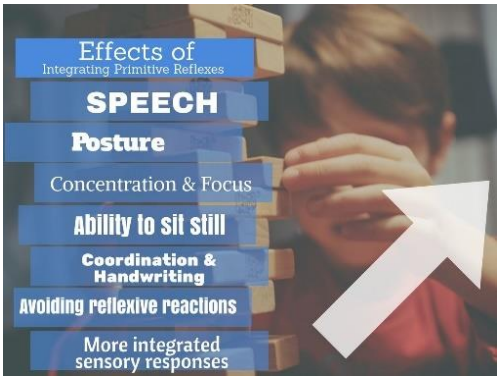
Movement is the key that integrates the reflexes into more advanced and sophisticated skills as a child grows. When working with retained reflexes, we give the parents easy 5-minute exercises which can easily be done at home.

In regular follow-up assessments these exercises will be modified and adapted to ensure a continued customization as the patient progresses.

When done diligently over a period of time, the reflexes become integrated, and symptoms disappear. A full program usually can be finished within one year.

What is the effect of integrating Retained Reflexes?

When integrating Retained Reflexes, specific difficulties will disappear, and learning will become easier for children who previously had retained reflexes.



INPP Questionnaire

Here you find a qualifying questionnaire, which means that a score of 7 or more 'yes' answers on the questionnaire below indicates that further investigation for underlying neuro-developmental delay is advised for children over 7 years of age*.

QUESTION	YES	NO
1. Is there any history of learning difficulties in your immediate family?	YES	NO
2. Were there any medical problems during the pregnancy?	YES	NO
3. Was the birth process unusual or prolonged in any way? E.g. Caesarean Section, Forceps, etc?	YES	NO
4. Was your child born early or late for term (more than 2 weeks early or more than 10 days late)?	YES	NO
5. Was your child's birth weight below 5lbs (pounds)?	YES	NO
6. Did your child have any difficulty feeding in the first weeks of life, or in keeping food down?	YES	NO
7. Was your child extremely demanding in the first 6 months of life?	YES	NO
8. Did your child miss out the 'motor stage' of crawling on his or her tummy and creeping on hands and knees?	YES	NO
9. Was your child late at learning to walk (16 months or later would be considered late)?	YES	NO
10. Was your child late at learning to talk (2–3-word phrases at 18 months or later would be considered late)?	YES	NO
11. Did your child have difficulty in learning to dress himself or herself, for example, do up buttons or tie shoelaces beyond the age of 6-7 years?	YES	NO
12. Does your child suffer from allergies?	YES	NO
13. Did your child have an adverse reaction to any of his or her vaccinations?	YES	NO
14. Did your child suck his or her thumb beyond the age of 5 years?	YES	NO
15. Did your child continue to wet the bed, albeit occasionally, above the age of 5 years?	YES	NO
16. Does your child suffer from travel sickness?	YES	NO
17. Did your child find it very difficult to learn to tell the time from a traditional (as opposed to digital) clock?	YES	NO
18. Did your child have an unusual degree of difficulty learning to ride a bicycle?	YES	NO
19. Did your child suffer from frequent ear, nose, throat, or chest infections at any time in development?	YES	NO
20. In the first 3 years of life, did your child suffer from any illnesses involving extremely high temperatures, delirium or convulsion?	YES	NO
21. Does your child have difficulty catching a ball, doing forward rolls/somersaults and stand out as 'awkward' in PE classes?	YES	NO
22. Does your child have difficulty sitting still for even a short period of time?	YES	NO
23. If there is a sudden unexpected noise, does your child over-react?	YES	NO
24. Does your child have reading difficulties?	YES	NO
25. Does your child have writing difficulties?	YES	NO
26. Does your child have copying difficulties?	YES	NO
27. Has your child had a diagnosis?		

* Research (published in The British Journal of Occupational Therapy, October 1998) has shown that a score of 7 or more 'yes' answers on the questionnaire below indicates that further investigation for underlying neuro-developmental delay is advised for children over 7 years of age.

In Closing

We hope the information in this booklet is of help to you. Don't hesitate to approach us if you have questions.

We are always happy to come to schools, clubs, parents' meetings etc. to educate the public about healthy visual habits and Integrated Cognitive Orthoptic Remediation – if you would like to book us for such a talk, please get in touch: we look forward to hearing from you.

Your Orthovision Team

[i] Image source: http://blog.allaboutlearningpress.com/matthew-effect-in-reading/

[ii] Image source: http://blog.allaboutlearningpress.com/matthew-effect-in-reading/

[iii] Source: visionandlearning.org & thevisiontherapycenter.com