

How a teacher can recognize, assess and screen

for

**Visual dyslexia, visual dyspraxia and other
vision linked stress**

An Essential handbook

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Contents

- Introduction
- What is visual linked stress syndrome
- History
- Incidence levels - Is it in my class?
- Recognizing the signs
- Screening for teachers
- a simple questionnaire
- tests for teachers
- how to refer and who to refer to
- legal and ethical matters

Introduction

If I said that I was going to make it much more difficult for around a third of children to achieve their potential in your class what would your reaction be? If I said that not only would I make it more difficult to read, their writing would suffer, their concentration would be reduced, they would become mal-coordinated, underachieve in examinations and their self esteem would take a battering. **Would you insist on change?** If I said this is what is happening in your class today, would you be shocked?

Our children are suffering from a visual perceptual epidemic of massive proportions – it's just that it hasn't been recognized. For the sake of a name we have called it Vision Linked Stress Syndrome (to include visual aspects of dyslexia, dyspraxia, migraine, sensory integration problems). The good news is that quite simple changes in the classroom can help a large number of children and that for those that require added input treatments are simple, non invasive and relatively inexpensive.

What is Vision Linked Stress Syndrome?

Vision linked stress syndrome (VLSS) is a name for a wide range of problems caused by inappropriate visual stimulus. Symptoms include those most common in dyslexia, dyspraxia, and many found in sensory integration problems. Some people may have heard of the terms scotopic sensitivity syndrome, visual dyslexia and visual stress. These are all incorporated into VLSS. Symptoms are very common although generally unrecognized by most professionals at the present time as a visual processing syndrome - although this is changing quickly- and sufferers are often accused of laziness, or lack of concentration and motivation.

VLSS is probably ***the*** biggest cause of underachievement in the classroom. It manifests itself in a variety of ways, from underachievement in reading due to overtly visual causes to concentration and sensory integration problems.

It is likely that VLSS is provoked by the environment and task presented e.g. the text in a book, and we all have some slight symptoms., However it is only when problems caused by VLSS are substantial that they need to be addressed.

In the case of many children it is the ergonomics of the classroom itself and the way that the work is presented that actually causes an impediment to visual processing. This results in underachievement, poorer exam marks and personal misery. This book is designed to help the teacher recognize when visual perceptual problems may be a factor in the underachievement of a child, how to confirm whether VLSS is present and what actions should be taken.

History of stimulus modification

In the 1930's it was first recognized by the Syntonic movement of optometrists in the USA that visual stimulus could have a significant effect on many conditions. However, it was not until the 1980's that Helen Irlen produced a system of assessment using overlays and tinted lenses for use in education. Around this time behavioral optometry was developing techniques using exercises to attempt to modify neural pathways in the belief that they had not developed correctly and that eye movement was aberrant in children with dyslexia. Occlusion (covering one eye) in conjunction with exercises was suggested as an answer by John Stein. In the 1990's the first mechanical method of colour space assessment, The Intuitive Colorimeter, was developed by Arnold Wilkins. Around that time I was successfully experimenting with monocular tinting and contact lenses for the treatment of reading problems: in essence a combination of occlusion and tint therapy. All these techniques had something in common, they believed that there was a physical aspect to the underachievement of many children with dyslexia and that cognitive assessments were often trying to remediate a physical problem. Recent research (by ourselves and others) has proved conclusively that this is the case.

It had become apparent to me by the latter years of the 1990's that a more radical approach was required in both assessment and treatment of children with reading problems. Advances in understanding of integrated physiological aspects of the visual system with mathematical developments made it possible to develop new measurement techniques, innovative instrumentation and lens design. As a consequence of these developments a multidisciplinary team (Orthoscopics) was put together to forward techniques that could create a new standard of assessment first in visual aspects of dyslexia and subsequently in a large number of other conditions. Government help was forthcoming with instrument development and support was given by a number of companies. The results using the techniques developed by this team were so dramatic that older methods appeared obsolescent to me and my colleagues. Trials were performed with impressive results although more questions became apparent, particularly in sensory integration. Further trials are underway.

Training for a number of professions was shown to be necessary (for optical professionals a post graduate diploma course has now been devised and it is hoped that an intensive course for educational and other professionals will follow shortly.), new lenses were designed (the first type specifically designed to change neurological function – Hoya VDEX precise – completely different from previous lenses for dyslexia . In the past lenses that have been used in dyslexia treatment have been virtually indistinguishable from standard plastic lenses with “normal” tints. The VDEX Precise lenses are very different to all other lenses currently used in treatment of visual dyslexia. Even though they may look identical to a teacher, the difference is substantial and the results are very different , in some cases one type of lens will work, the other will not!. This is an instance in which you should not trust the evidence of your eyes, a seemingly identical pair of lenses may be very different in effect.

Incidence levels –Is it in my class?

From recent research it appears that around a quarter of all children underachieve significantly due to VLSS. In trials of children with reading difficulties this fraction increases to around two thirds. The syndrome is so common it can be described as the hidden epidemic. It is almost certainly present in your class.

Current educational, psychological and optometric tests are not designed to identify whether VLSS is a factor or to what degree it impedes educational attainment. Therefore it is imperative that a new paradigm is put in place to allow children to be assessed and suitable responses to be taken. In other words change is not only desirable but it is essential if improving classroom attainment levels is to be achieved.

The first step is to recognize the child who is suffering from VLSS.

It is important to realize that it is not just those who are in learning support or who are considered dyslexic that have symptoms of VLSS. In the table below the percentages of children in a whole year group with some symptoms of VLSS are shown.

Year group children aged 8-9 (111 subjects)

words appear jumbled	29%
double vision	31%
text compression	30%
words or letters displacement	21%
inversions / reversals	14%
vibration	19%
letters / words appear to change shape whilst viewing	12%
text disappearance or	5%

bleaching	
colour of the text or	11%
asthenopia	9%
intermittent scotoma -	19%
intermittent blurring?	29%

The child with VLSS

It is crucial to realize that signs and symptoms exhibited by children are variable, may be caused by other factors other than VLSS. They may be described differently by a child from the way in which they are described in this text. Recognizing that VLSS may be present is reasonable for a teacher to do (indeed teachers and classroom assistants are probably the best people to undertake initial screening), but differential diagnosis is an unreasonable burden. It is reasonable to expect a teacher to be aware of how VLSS affects education and take appropriate action and be able to liaise with other professionals for the benefit of their pupils. As the condition is found in every class I would anticipate every teacher should eventually have at least a basic knowledge of the subject as every child should have an expectation that their teacher can take appropriate action. Hopefully it will not be too long before this is a reality.

There are three methods of initial recognition, observation, questioning and screening. A class teacher is capable of all these and should not be discouraged from using their initiative. It is critical that a special needs teacher is fully aware of VLSS and takes a pro-active stance as such a high proportion of children in special needs exhibit clear and significant levels of VLSS.

What causes Vision Linked Stress Syndrome?

The mechanisms that cause VLSS are unclear at present and although there are a number of theories in the public domain that relate in particular to visual aspects of dyslexia, none adequately explain all of the symptoms satisfactorily.

It is likely that there is a number of causative factors in VLSS and I believe that the disturbance of one or more of the combination of three forms of mapping (colour, sequential and temporal) in the visual system can be shown to predict all symptoms although this hypothesis has not been published and subject to scrutiny. It does however allow a predictability of symptoms, both visual and non-visual, unlike any of the other theories.

Symptoms found in VLSS may be primary i.e. visual or secondary i.e. non visual symptoms may be caused by visual stimulus. The theories, arguments and models are however beyond the scope of this book

Initial recognition

The class teacher or classroom assistant are almost certainly the best people (along with an observant parent) to recognize whether a child is likely to have significant visual processing problems. The most important way in which this can be achieved is careful observation. In addition, questioning of the child is probably most effective when the interviewer knows the child and the subject is relaxed. The observer must be aware that all symptoms exhibited may be variable and related to arousal levels, task and environment. Observation should therefore be ongoing. Symptoms may develop at any age depending on task and severity; the earlier they are apparent, the worse they are. Indeed, they often develop when either text size reduces or the ability to use coping strategies cannot compensate for increased work pressure or volume. The plateau of attainment sometimes experienced by teenagers may often be an indication of VLSS.

Observation may be passive or active i.e. specific tasks may be presented that are likely to cause a problem. If a child is underperforming whilst reading a text it may be

appropriate to present the text differently and compare results. We will discuss how this can be done later. Similar symptoms must be differentiated, e.g. when a child reads d/b incorrectly is it that they see the letters wrongly or do they decode them incorrectly? The difference is critical in resolving the problem.

Are the problems a child is experiencing with copying a word from the board to their exercise book due to their inability to see the word properly, transfer the visual information into a language form, use their memories to decode and understand the word or transfer the information to their hands for writing in conjunction with the visual information coming back as they write? One answer does not fit all children although the result is superficially the same.

So, is there a “checklist” that can be used during observation of a child?

How to observe

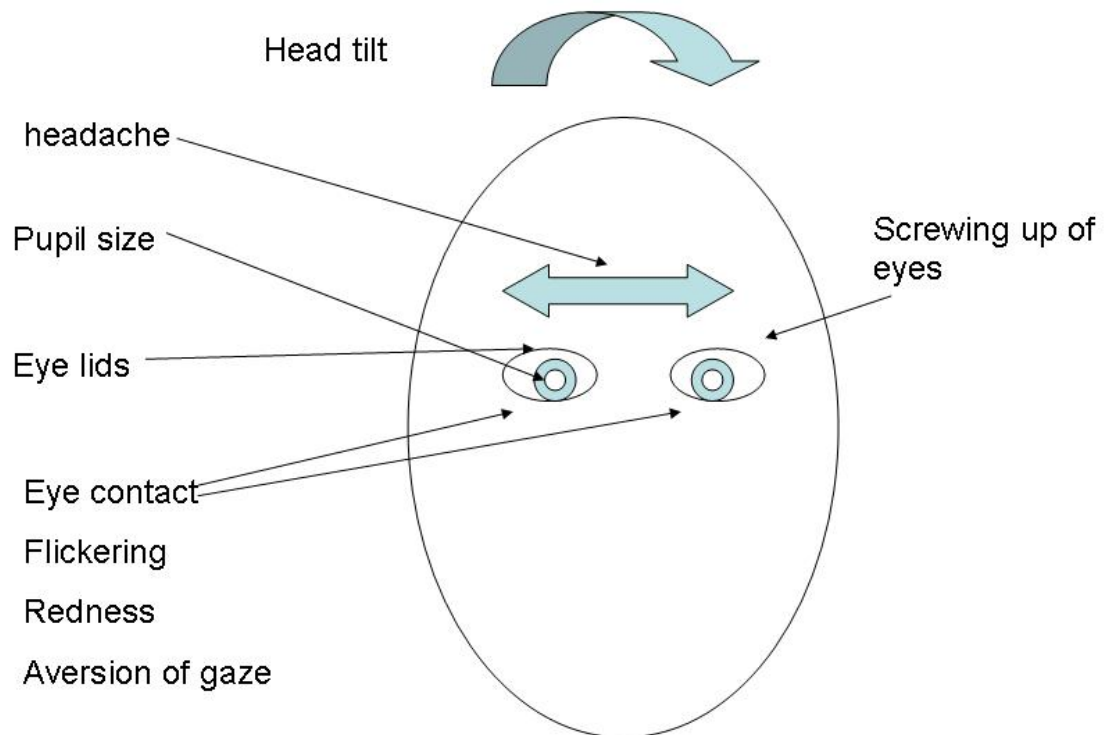
Passive observation of all children by teachers and other professionals is essential. Although a child should be assessed holistically it is easier to describe each area separately. The first step is to observe the whole child, preferably without them being aware.

Observing the child (a basic overview)

Whilst it is extremely difficult to watch every child carefully in a class, it is perhaps the best method of initial screening for VLSS.

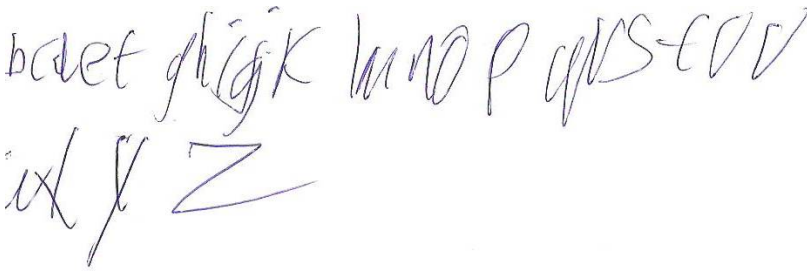
Observe carefully for:

- Is head rotated or tilted (Torticollis) – Look for a twisted posture as a result of head tilt
- Is gait normal? – look for tip toeing, one leg rotating more when walking, crabbing.
- Is eye contact normal? Look for gaze aversion. In addition look for how the child holds its reading book, look for abnormally close reading or an unusual head position
- Are pupils of the eyes abnormally large / small. Large pupils that may react incorrectly to light stimulus may be found.

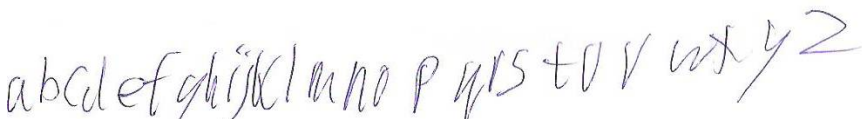


- Do the eyes appear to flicker? Look at the child's eyes during reading (this is difficult to see)
- Does one of the top eyelids appear to droop when reading?
- Do they rub their eyes a lot?

- Does the child have red eyes? (even as result of rubbing, this is important)
- Is the child clumsy? (they may exhibit bruising as a result of walking into objects including the classroom door frame)
- Is writing very poor / uneven? Watch also for abnormally hard pressure and unusual grip to the pen



 a b c d e f g h i j k l m n o p q r s t u v w x y z



 a b c d e f g h i j k l m n o p q r s t u v w x y z

A typical immediate change in handwriting using the PAT light

- Does the child fall often? Steps, stairs and edges may be difficult to see or place in their visio-spatial map for some children
- Does the child say “what” regularly? The child may be having auditory or auditory processing problems. Some of these may be caused by VLSS
- Does the child have an unusual voice? High pitched voices often indicate VLSS is present
- Does the child have a speech impediment? E.g. w/r, th /f /v difficulties may be caused by VLSS
- Does the child appear “vacant” and become transfixed? VLSS may be a problem but remember to consider the risk of epilepsy and therefore medical advice must be sought.
- Does the child have difficulty with the board – VLSS or a refractive problem may be present. Do they need spectacles?

Does the child appear to have a poor memory when copying? Sequencing, omissions and doubling of letters may be VLSS not memory or coding.

Observe during reading

- Does appear as though the child has difficulty fixating individual words? – Their eyes appear to “bounce” around the page and are unable to read adequately.
- Does the child have difficulty moving from one line to another? There is always a need for spectacles or treatment for VLSS if this is present.
- Does the child rub their eyes when reading? Occasional tiredness is normal but if it happens every day be suspicious.
- Does the child avoid looking at text? This is usually a sign of VLSS
- Do they guess words e.g. the / that/ those/ them? Bits of words will often squash together or sometimes disappear in VLSS causing the child to guess. It is dependent on the position, the size and type of font (italics usually worst) and the ambient lighting and is therefore intermittent.

Squashing and disappearance of text

The boy who sat next to three girls

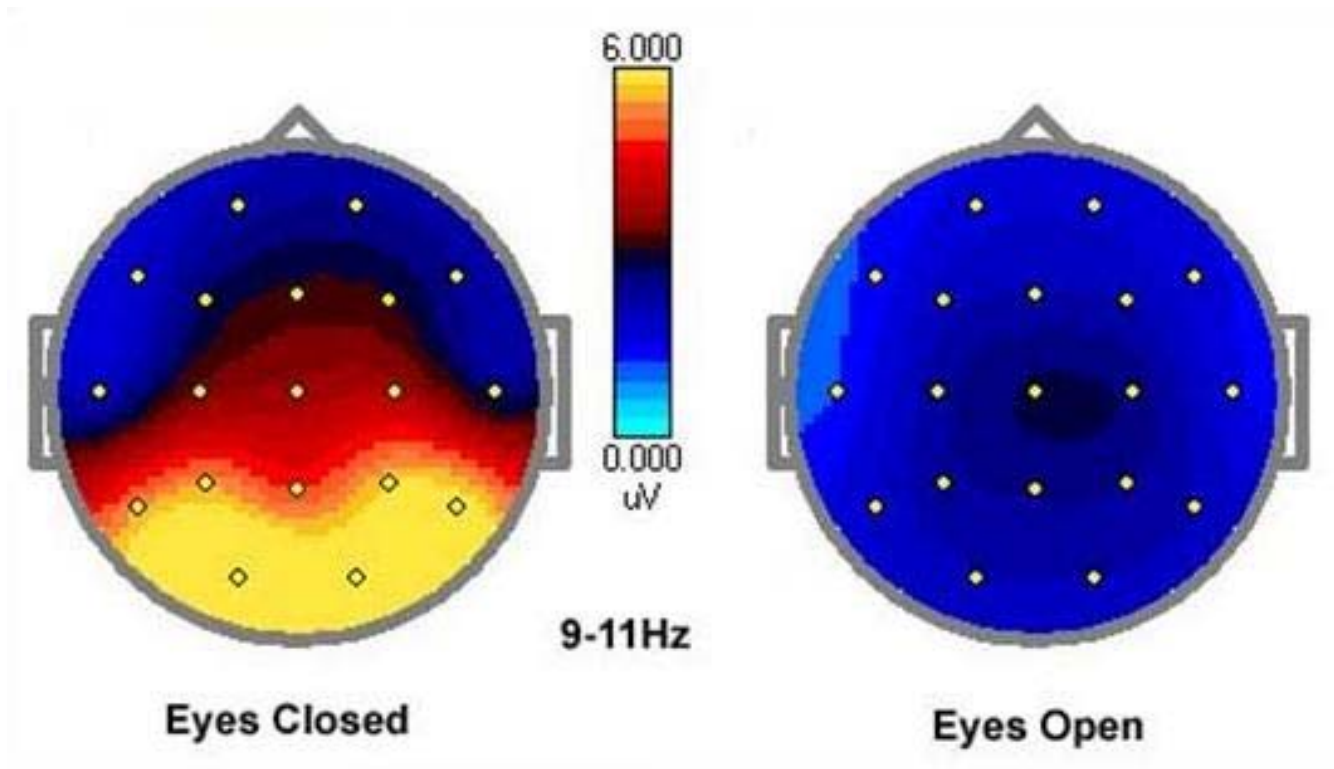
May become

The boy wh sat next to ~~three~~ girls

- Do they get letters or words reversed or inverted e.g. d/b, p/d, m/w, was/ saw? If a child sees reversals or inversions then they have VLSS.
- Do they appear to follow movement of letters / words on the page? e.g. a word may appear to displace or double whilst the text appears stationary. These symptoms indicate VLSS.
- Is the child easily distracted? Many reasons for this, one of which is VLSS.
- Does the child read the words as though the letters are sequenced incorrectly? e.g. bad – dab – differentiation is necessary between those that see the letters incorrectly from those that cannot code the sequence.
- Does the child rotate the book on the desk (regularly)? Suspect VLSS
- Does the child cover one eye when reading (or create the effect by the position of the text). This indicates refractive problems, binocular vision difficulties or VLSS. Referral is essential.

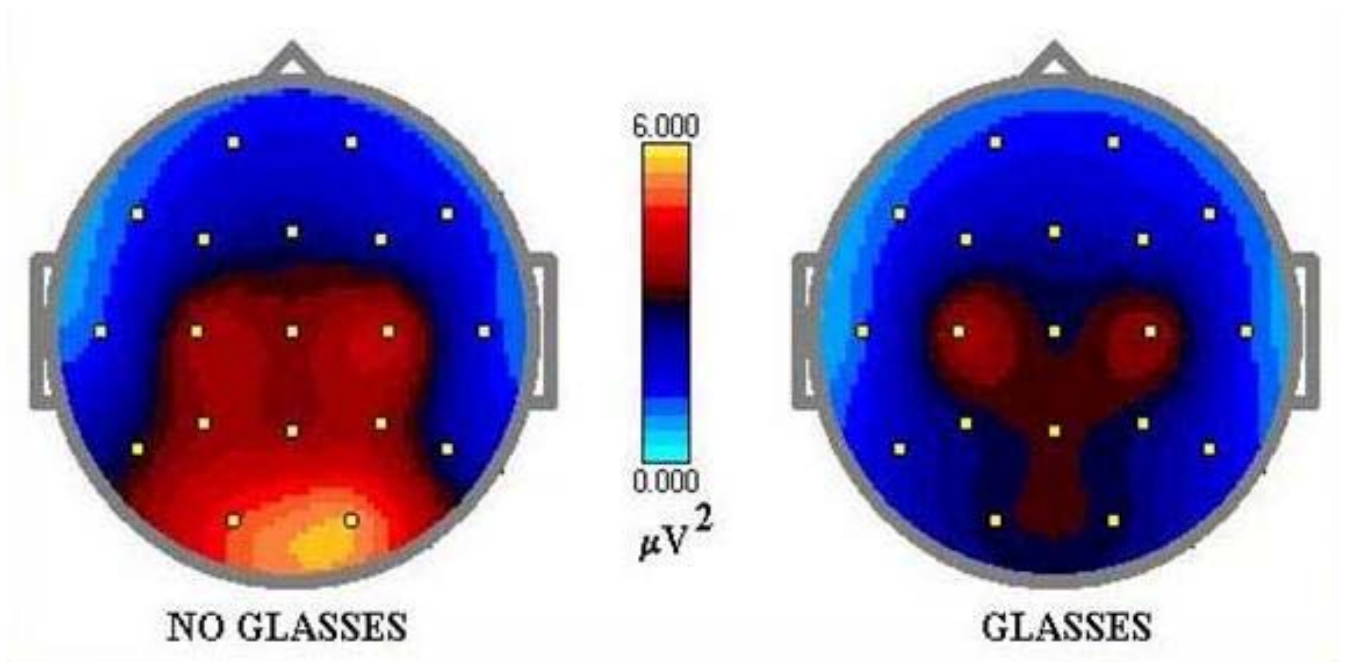
- Concentration problems are often the most obvious sign of VLSS due to the changes in the brain under school lighting. A teacher should always question why a child has concentration problems, not just accept and criticize them. Treatment often will resolve the problem immediately, perseverance is not a good option for the child.

EEGs of normal child



Compare the EEGs of a “non VLSS” child closing his eyes with his eyes open (school lighting) to a an underachieving VLSS child

VLSS child in school lighting 1st without and then using VDEX Precise lenses



In the VLSS child the processing of the child is similar to that of a normal child with it's eyes closed. Using the VDEX Precise lenses the EEGs become much more normal.

This means the child now has the opportunity to process information, they could not possibly have done this before and educational interventions are inadequate in this case. Can you imagine the effects for this child in his exams!

- Does the child underachieve without good cause? Be suspicious.
- Has the child a diagnosis of dyslexia, dyspraxia or ASD. In all cases these require a full visual processing assessment.

Active Observation

In some cases the class teacher should change the ergonomics of the class. Background noise should be eliminated when a child with problems is reading as filtering unwanted information may be impossible for them. Lights should be turned off and the text should be copied, with much larger fonts (and different styles), with narrower page widths. Double spacing of the words will also help for some. Try using a visual tracking

magnifier for a child who is experiencing difficulties. This may be used to help fixation, segmentation and tracking. It is best used with a reading age of eight or below. Get a child to cover one eye when reading, does it improve? If so refer. Use the reading checklist and compare under daylight rather than artificial lights.

The next stage of assessment is that of questioning the child. This can be done in a number of ways. It is possible to ask the whole class questions from a questionnaire with a mark determined by numbers of symptoms reported. Alternatively, individuals may be questioned in private. Questioning is a skilled art: suggestion must be avoided but sometimes it is impossible to explain concepts without some degree of suggestion. Any reasonable adult should be able to determine when to be suspicious of results.

A good way to question is to ask a question such as “Do the words ever jumble up?” If the answer is “yes” then follow it by “What do they look like?” or ”How do they jumble? ” – some of the answers may well surprise you. Children are often the best observers of all. They are often very precise in their understanding of the visual anomalies; so much better than the experts!

A short questionnaire with explanations

1. Do the words or letters appear jumbled / strange?

An overall child’s view is important. If the answer is yes get them to explain, be prepared to be surprised by their answers. Do NOT discount their answers; any which appear unusual and outside of your limits of knowledge should be referred. Remember to write down precisely what they say. Do not tell them what they are seeing, you cannot know, and if they are seeing something unusual their description may be very strange indeed!

2. Do the words or letters reverse or invert?

If a child sees the letters words or lines reversed or inverted it is essential that this is addressed by a competent vision professional. Educational techniques are NOT acceptable. However reversals in writing do not always indicate a visual problem. Assessment and treating this using the PAT lamp often achieves immediate symptom cessation. This should always be tried prior to other methods of sensory integration.

To differentiate between whether a child sees the text incorrectly and VLSS is present it is prudent to ask the child whether they see the letters or words incorrectly. VLSS will be an intermittent problem and they will be aware of visual reversals. Visual reversals and inversions are provoked by lighting, size, font style and position.

The most common visual reversals are b/d, p/q, was /saw

The most common inversions are b/p, q/d, m/w, f/t

These must NOT be ignored in children over seven years of age.

e.g. The fat quadruped was duped
could end as (an extreme example)

The taf dnabrnqep saw budep

3. Do the words or letters change sequence?

Some children see the letters or words in the incorrect order. Using language based techniques e.g. phonics is incorrect in these cases. Although these symptoms are virtually always VLSS other conditions must be ruled out by the optical professional.

e.g.

The man walked up the hill

Could end as

The man wakled up the illh

4. Do the words or letters move to a different part of the page?

A common symptom found in children is that of individual letters or words appearing to physically move to a different part of the page whilst the rest of the text appears to be stationary. This symptom indicates a full assessment is necessary. They will often appear to exhibit fixation difficulties and read the wrong word on the page.

e.g. the boy was keen on football

could end as

the was keen boy oon fotball

5. Do parts of the words or letters disappear?

Parts of letters may be lost thereby changing comprehension e.g. o/c l/i, but more commonly parts of words are lost. This phenomenon is usually found at either the beginning or the end of a word causing the child to guess the word from the context and the part of the word remaining. This is an intermittent problem and is directly related to task presentation and angle.

e.g. the girl was unhappy with her friend

could end as

the girl was happy with her friend

6. Do you get double vision or multiple images?

There are a number of types of double vision; some normal, some due to binocular vision problems, some due to optical media problems, some due to neurological or pathological problems and some due to VLSS. Differentiation can be difficult and

therefore it is essential that referral takes place. VLSS treatment is found to stop double vision in which individual letters or words double and physiological double vision (due to convergence on a near object). The most common double vision with VLSS is that of individual letters being doubled

e.g. High tech

may become

High teeoh

7. Do words / letters / background change colour, fade or become “blotchy”

Common problems that always cause concentration difficulties are fading of text (background fades leaving one or two central words still clear but the child cannot see which word to move to next!), text or background changing colour or patterns (often squares or diamonds) appearing within text. Sometimes a band of fading appears at the mid line, possibly due to ocular dominance problems. Children may complain of “rivers” or trees through the text.

e.g. the man was going to the house.

8. Does the text become hard to observe?

Does the child find looking at some text uncomfortable? They will often avert their gaze. In the most extreme cases it is virtually impossible for a child to look at some text and the effects on their education are disastrous.

They are called lazy, lack concentration, stupid, achievement is minimal and their self esteem plummets. They will often be school phobic and play truant and who can really blame them! As adults they can often be found as guests of her majesty.

9. Is fixation or tracking difficult?

Tracking from one line to another may result in re-reading or missing a line out. Very occasionally we all do this but if it is recurrent then eye movement problems are likely. If a child has difficulty in word search fixation problems may be present. In all cases further advice must be sought and must not be ignored.

10. Do you see extra words or letters in the text?

Many children see extra words in the text. This may be a form of double vision or alternatively generated neurologically. If it occurs frequently then it is appropriate to refer.

e.g. the man car was going to the dog house

11. Do you have difficulty remembering what you have just read?

Memory problems are complex and not within the scope of this book. However, some types of sequencing are directly influenced by visual stimulus. If the only problem is memory it is more likely that it is not visually evoked. Some memory problems are addressed in a full visual perception test.

12. Do you miscopy words regularly?

Although memory is often claimed to be the cause of copying difficulties VLSS is often the major culprit. Check the difference between copying from the board and adjacent books (on both right and left sides, keeping text the same). If it is memory there will be no difference, if VLSS the difference may be striking. Other types of visual difficulty

may also be present if a child has difficulty with the board. Professional advice is essential.

11. Do any of the letters or words vibrate?

Individual letters or words vibrating indicate VLSS. This is a common symptom and will respond to virtually any change in stimulus for some. All words vibrating require specialist professional evaluation.

12. Do you get headaches or discomfort when reading?

Headaches starting in the temple area, shooting pains in the eyes, a dry gritty feeling in the eyes (causing rubbing), symptoms similar to sinusitis (easily misdiagnosed) and migraine with aura may indicate visual or VLSS problems. Headaches starting at the back of the head are not usually caused by visual stimulus. It is essential that the area of the headache is determined. Frequent headaches must be investigated.

13. Do you have difficulty filtering background noise?

Inability to cut out background auditory information (sometimes called cocktail party syndrome) is often caused by visual stimulus overload. Flicker, brightness and colour all contribute and modification will often cause cessation of symptoms. Therefore if a child has difficulty with understanding instructions it is necessary to assess. This common problem in the classroom is often unrecognized and the child will have difficulties with instructions and comprehension of the teacher and peer group leading to accusations of concentration difficulties and laziness.

14. Are some sounds painful?

Hypersensitivity to high pitched sounds is often provoked by visual stimulus. For those that have hearing problems it is essential that a vision and visual processing assessment is performed. If it is a visual problem with auditory symptoms it will resolve immediately.

15. Do you have difficulty following a moving ball?

Children with VLSS have difficulty with visual (and auditory) processing speed. In watching a moving ball they often see a trail or following images similar to those in cartoons. In addition their ability to move their eyes smoothly is often impaired. There is also a likelihood of a reduction in their field of view and they may have spatial awareness problems. Muscle tone may be reduced. Proprioceptive problems may be caused. In those with dyspraxia it is essential that VLSS is addressed. Sensory integration begins with the ability to see.

16. Do the words or letters crowd?

Overlapping or crowding together of letters makes reading difficult for many children. Text size may appear to be variable.

17. Do you trip or have difficulties with steps or stairs?

Children with VLSS often cannot judge edges well. Falling on stairs and kerbs is common. A child will often show scuffed shoes. Escalators may be a problem. Fluorescent light flicker difficulties are associated with this problem and the child will often experience frontal headaches, stomach problems, dry eyes / mouth, swallowing problems, spatial awareness difficulties.

18. Do you suffer from allergies?

There is strong evidence of a link with allergies, in particular asthma, eczema, hay fever and food allergies (especially milk and gluten). Stomach problems are frequent.

In general the more symptoms a child shows, the more likely VLSS is present and the greater the symptoms, the greater the need for treatment. More than three positives suggest that a full screening is necessary.

Full Screening

At this moment in time there are only a few screeners in the UK with sufficient training . Those who have been taught how to undertake an overlay assessment possess a little knowledge but this is not sufficient to screen for VLSS.

It would be logical for those with overlay training to upgrade as soon as possible as overlay assessments have major inadequacies and often miss the child with the most profound problems.

The full screening involves testing how the visual system input affects reading, writing, balance, speech, hearing, memory. Other tests may be introduced in the future as the skill levels of the screeners increase but it is more important that a competent level is reached by as many as possible.

Types of visual stimulus

Visual stimulation consists of colour, brightness, flicker, change and pattern. In addition conscious and subconscious memory is used.

This may be thought of in another way, colour and brightness can be considered a colour and brightness map, flicker and change may be considered as a changing signal input map, pattern may be considered as a sequential surface map. By modification of any of these inputs symptoms may be produced. Therefore if we provoke symptoms by stimulus it should be possible to stop them by changing or stopping the stimulus. This is the case.

Therefore the changes in stimulus that may be used are:

- Change the colour and brightness
- Change the flicker frequency and modulation
- Change the size
- Change the movement
- Change the sequential map
- Change the position of stimulus

This sounds difficult, but it is relatively straightforward (although the full theoretical basis is highly complex).

In general, we all have an envelope of colour and brightness stimulus in which we can function well. This varies significantly in size . This envelope of optimal stimulus **is often found to be outside the range of overlays and therefore they will not address colour/ brightness problems for many.**

The sensitivity to visual perceptual anomalies found outside the envelope varies from minimal (in which case stimulus will be unlikely to cause problems) to highly sensitive and critical (which causes profound problems). It is now possible to determine this envelope (and any subsidiary envelopes) using the instrument which replicates the effect of stimulus on retinal function - the Orthoscopes Read Eye. This would be used in a VLSS assessment. It is not suitable for teacher use.

In addition a VLSS full assessment will address visually evoked sensory integration problems, processing speed, eye movement, visio spatial awareness. It takes at least an hour after an eye test. It can even be undertaken on those without reading ability. Whilst not available through the health service it is often an essential assessment for an underachieving child. Costs of not addressing this problem outweigh the assessment and treatment costs by an enormous margin (probably fifty times as much!) and I believe that as a country cannot afford not to address this issue.

What is an in depth screening?

It is essential that a screener is trained adequately to recognize when VLSS may be a factor in the under attainment of a child. It is also critical that they are aware of when to refer, how to refer and be prepared to liaise with and respond to an optical professional who is trained in this area. The most important person is the child and cooperation between professionals is of the utmost importance. The screener should undertake two types of tests: visual and non visual responses to visual symptoms. It is strongly advised that a screener undertakes formal training.

Visual tests

There are a number of tests the screener can undertake: some are very simple, others require a small amount of instrumentation. Tests may be subjective (the person tells the screener the results) or objective (the screener observes the results themselves). A routine should be established.

History and symptoms.

The screener should be aware of classroom records and ideally should be given a class teacher's report on potential problem areas.

The questionnaire should be used (either as part of the teacher's report or undertaken by the screener). Ask also about other sensory difficulties including hypersensitivity to smell, touch, and taste. Observe speech and memory (7 digit test, number and letter, is good).

Posture should be observed, watch for swaying, ankle and feet compensation, how straight is the body.

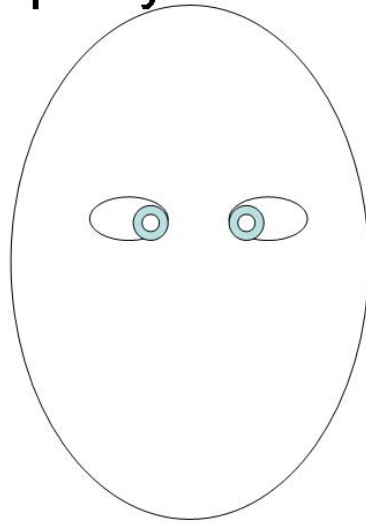
Check balance by getting the child to stand on each leg (watch for toe and ankle compensatory movements).

Visual tests

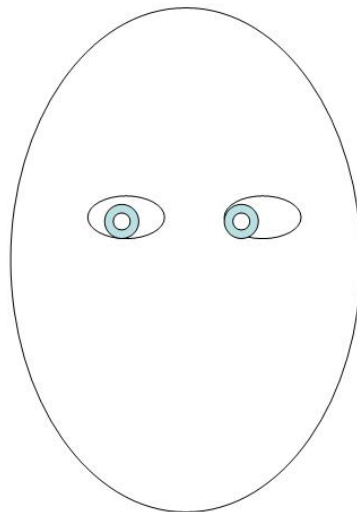
Stand a child directly in front of you.

Holding a pen at arms length from the child, tell the child to watch the top of the pen, bring it slowly closer to the nose, and observe eyes carefully. They should converge smoothly and equally to a position of closer than fifteen cm from their nose. The eyes should appear crossed as you approach his nose. If a child cannot get to around 15cm it will be impossible for their visual system to function normally at reading distance for a prolonged period.

Normal convergence, both eyes
equally



Right eye static, Left eye converges



Abnormal responses include: no convergence, one eye converges much more than the other, the eyes appear to flicker, one eye may diverge after converging, convergence may be only possible to too far away to read. In addition the child may develop red

eyes, abnormal blinking, discomfort and aversion. They may complain of double vision or pain. Rarely pupils may react abnormally and the top lid may droop.

The next test involves moving a pen at about 25cm away from the nose of the child across the mid line (about 30cm travel) at a reasonable speed. The eyes should be able to follow this movement easily and smoothly. Watch that the angle between the eyes stays the same.

Abnormal effects are common in those with VLSS and some binocular vision problems. These include the eyes appearing to have a jerky movement (sometimes more in one direction than the other), a sudden short reversal on crossing the mid line, end point nystagmus (oscillations at each end of the eyes travel). The child may find this test extremely uncomfortable if they have a significant visual processing problem. Double vision is often reported during the test. Eye rubbing and distress symptoms are common. For advanced screeners a variation of this test incorporates a figure 8 shaped movement. A further variant will involve fast eye movement to two pens placed at about 25 cm away about 30cm apart and comparing fixation.

Pattern glare test

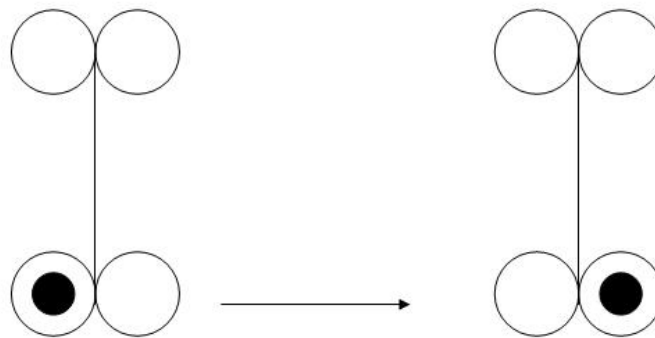
A simple test for discomfort due to patterns in text is available to those who are trained in its use. This is essentially a pattern with a figure at the centre which is moved in a specific way in front of the eyes to determine whether pattern and pattern position cause problems. This test will reveal whether the text may cause problems with general stability. Results can be astounding.

Reversal and inversion test

This test requires training. In the case of a child that may reverse or invert letters it is possible to provoke the effect without using letters demonstrating beyond doubt that it is NOT a language problem in these cases. Patterns similar to letters are moved in a

specific way to confirm whether visual reversal or inversion is present.

One type of reversal inversion test



Dot appears to migrate from one ball to another, it may migrate vertically / horizontally

Three ball test

Many children have a visio spatial deficit that is dependent on distance and position. This is particularly important in dyspraxia. The three balls appear to move relative to one another to those with this problem. In a more advanced method the balls appear to move relative to the background, showing displacement effects (the same as words moving on the page). Results can be dramatic.

In addition the more advanced test can be used to investigate plane skew which varies considerably in those with dyspraxia.

Visual acuity

Check how well a child can see both a distance chart and reading chart. Remember that some reading problems may be refractive and acuity may be reduced. Children should usually see the bottom line with each eye. If one eye is lazy (poor vision) it may have effects on their processing (split brain effect). Do not underestimate the effects of poor retinal correspondence on education.

Speed of Reading tests

There are many on the market, any may be used, but remember that treatment may actually reduce reading speed in those who have been skim-reading.

Writing

Observe grip, pressure, angle of lines, letters, and memory. The scrawler may have a visual component in their lack of fine motor control. PAT testing is essential.

Reading a text

The screener should listen to the child reading at the limit of their ability, preferably using books that they have not read before. Text should be plain. Any difficulties should be investigated by questioning. Even if the presenting problems are not reading problems it is still useful to do this test.

Overlays

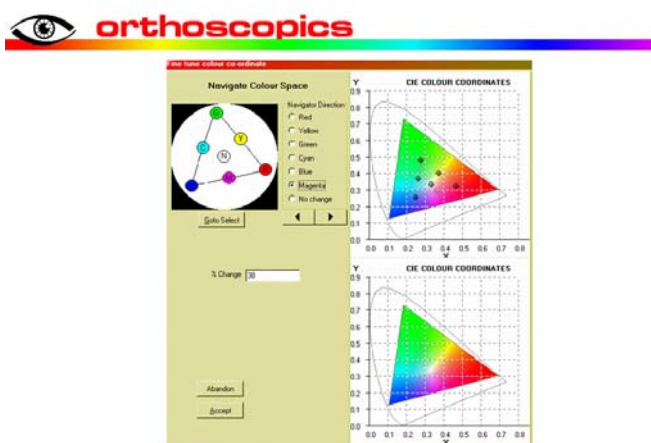
Overlays are produced by a number of companies and teachers often pay a high price to learn how to use them. There are a number of problems with overlays and their assessment of which teachers and parents should be aware before using them. I would recommend them only as an interim measure until a full visual perceptual assessment

is undertaken. We use sixteen million colours in a full assessment - using overlays restricts you to the combination of colours the assessor can obtain with their range of overlays (perhaps 20).

The next problem is that as the ambient lighting changes (moving seats in a classroom for instance) the overlays may not help and possibly may even be detrimental. The lighting of the room in which the child is tested will also be a factor and changing the effect of the overlay from one lighting condition to another is a long way beyond the ability of virtually all teachers. Your vision is inadequate for this task. The mathematics is complex and important.

Overlays cannot be used when writing or walking. I also consider it essential that the person undertaking the testing is qualified in one of the optical sciences due to the level of understanding of optical principals that is required.

The main stumbling blocks to overlays are that the most profound problems will often not show up in an overlay test and that the overlay tester is not able to access the colour envelope in which the child's vision stabilizes. This means that the worst cases may remain undetected, with all the consequent problems. If you are to test colour then you **MUST** use best practice. The best practice is to use the PAT lamp.



One form of assessing colour using scientific methods.

PAT lamp

This lamp is based on a RMS analysis of retinal function and can address about 73% of all colours that are possible for the human eye to see. It is calibrated logarithmically to match the way the visual system works. The good thing is that if it does not show an effect on visual performance then it is unlikely that anything will. This gives an absolute indication of whether or not the problem is visual which cannot be obtained by the use of overlays.

The PAT can be used in conjunction with many of the tests described and, with training, effects can be shown immediately. All children should have access to assessment using this lamp by a trained operative.

Visual tracking magnifier

This is an essential tool for both the class teacher and the special needs teacher. It is used to improve fixation, angular size and, when rotated, segmentation. It will often show VLSS is present and can be used to alleviate some fixation problems.

Interventions

In all cases a significant improvement should be evident after the intervention. Small improvements are more problematical - are they significant? There is a simple series of tests:

Try tests with the lights switched off.

Try using the Visual tracking magnifier

Set optimum colour space position with PAT light and compare

Referral

It is essential that adequate records are kept (they will protect you if litigation looms. If you have not written it down, it wasn't done). In addition a referral letter is appropriate if you wish to send a child to an optical professional who knows how to

deal with VLSS. Keep a copy of this letter. A cd rom is available which can write the letter for you, but a self-written letter will suffice. The letter should note the symptoms IN DETAIL, including the non visual symptoms. Do not make it a beautiful example of creative writing; simple statements are better. Ask for a reply suitable for school records.

The optical professionals

The first requirement is a full eye examination. Any disease or abnormality should be discovered as should any refractive errors and any binocular vision anomalies. Disease should be addressed and refractive causes corrected. There is however a debate as to whether some binocular anomalies are cause or effect of visual fusion problems and therefore there may be more than one way of addressing this area. However, most optical professionals have a limited knowledge of VLSS. Some have assessed colour for dyslexia in the past using subtractive methods. There are significant problems using this technique for assessment, in particular when addressing sensory integration problems or testing those who cannot read or communicate. The only method and lenses that are suitable for many children are those of the Orthoscopies system.

A report should be sent to you in understandable English and anything less should be returned for a translation (it is unprofessional to try and hide behind complex jargon when the report is supposed to be for a different profession). It should be concise and describe diagnosis, treatment, prognosis and what should be undertaken by the school.

Legal and ethical

It is not clear where the responsibilities lie for VLSS. Is it educational, optical or medical? It is clear that there are potential risks of legal action. As the symptoms are provoked by the environment i.e. the classroom, does the school have a responsibility to ensure that it is a satisfactory and safe environment? Do the symptoms qualify as a disability? Where does duty of care stop? Is it the responsibility of the optical or medical professions? Is it a parental duty? I don't have an answer.

Summary

VLSS is a common condition which requires everyone in education to take appropriate action in order for it to be overcome. In partnership with other professions it is possible to have a major impact on the child's life if such action is taken.

The costs of not addressing the problem are enormous - to education, to society and, most importantly, to the child. Self esteem, examination success, sporting prowess and future earnings are all affected. VLSS is a condition which can seriously diminish the sufferer's quality of life. If we value our children we should not expect them to endure it.

If you need training your LEA can organize it through info@Orthoscopies.com
Individual courses may run in the future.

Ian Jordan FBDO CL is clinical director of Orthoscopies Limited. Having initially trained as a dispensing optician specializing in contact lenses he managed the national flagship practice for Boots opticians before setting up a small successful chain of optometric practices in NE Scotland. Whilst in Scotland he developed an interest in research into the effects of visual stimulus on sensory pathways and was awarded an ABDO education bursary to further this. He subsequently won a number of other awards for R&D including the Grampian innovation award, finalist and also runner up John Logie Baird award for medical innovation and was part of a team that won a government merit award for laser development. He was almost certainly the first person to use contact lenses in experimentally in dyslexia treatment and has become an internationally recognized speaker in visual perceptual anomalies. The research, lecturing and writing became too time consuming and therefore he sold the practices and moved into full time R&D and became an author of 4 books, 2 cd roms, designer of a range of lenses for Hoya, designer of the VTM range of magnifiers for COIL, and became part of the Orthoscopic team which has developed a new range of award winning optometric instruments and tests that is now selling in the UK. He has written a post grad diploma course for optical professionals. His work has been featured in BBC national news and documentaries, BBC radio and the national press. Currently he is involved in a number of clinical and other trials in sensory integration effects of vision. He may be contacted on IanJordan@visualdyslexia.com but cannot comment on individual children he has not seen. He is gregarious, happy and easily bribed with chocolate.

