

Article ▶ Role of Optometry in the Management of Vision and Ocular Health of Patients with Mental and Emotional Disturbance: Part 2

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ABSTRACT

Background: The second part of this literature review expands on understanding the relationship between aspects of vision and a person's mental wellbeing. Three case studies are used to discuss limitations to treatment and how the lifestyle of patients with mental illness may affect the outcome of their treatment; how medications may impact vision and ocular health; and the use of stress relieving lenses. This part also investigates imagery, both positive and negative, in patients with mental illness. Finally, the relationship existing between anxiety, emotional wellbeing, and learning is discussed.

Keywords: gut microbiota, major depressive disorder, medication, peripheral awareness, schizophrenia, stress relieving lenses, visual imagery, visual perceptual dysfunction, visually related learning problems

Introduction

Successful patient outcomes require good communication between the clinician and patient. In patients with mental and emotional disturbance, one may have to think laterally to find the best solution for their visual problems. Part of the solution maybe outside the expertise of the optometrist and referral may be required to the appropriate allied health professional such as a dietician or psychotherapist. Visualisation, relaxation techniques, and stress relieving lenses can also be part of the optometrist's tool box for successful patient outcomes.

Limitations to treatment

The consistency and frequency of treatments may be limited in patients with mental and emotional dysfunction due to external factors. The management of visual dysfunction in such patients may be limited due to associated physical disorders, effects of medication changes, 'bad days' on the part of the patient, cultural considerations, and lack of support.

As an example, I discuss the following case of Ms. B, aged 50. She presented with symptoms of diplopia at distance and had suffered with chronic depression for many years. She lived alone, had a job which entailed working on a computer all day in a dreary office, did not eat particularly well, did not exercise, and had very little social life – this was her own description! A colleague at work would sometimes massage her shoulders to try and release her tension. Ms B. presented complaining of diplopia at distances past about one metre which she had experienced for 10 years. She was very self-conscious of her eye turning in when she was talking to people. She couldn't really concentrate on listening to the other person because she was too concerned about the appearance of her eyes. Her prescription was moderately high myopia with presbyopia, and she wore contact lenses as well as a variety of glasses with and without prism to control her diplopia. She had investigated her condition via the internet and was interested in vision therapy. She had

already bought herself a Brock string online but was unsure what to do with it.

Visual assessment showed divergence insufficiency esotropia. Her condition was longstanding for the last 10 years and pathological causes had been ruled out. We began a vision therapy trial beginning with monocular fixation and accommodation activities, central-peripheral awareness, and peripheral stereopsis activities. Ms. B found the direction of vision therapy activities very hard to understand. She found it difficult to comprehend how working on her peripheral visual system would help her to fuse the images from her two eyes. During therapy sessions she would frequently berate herself for not being able to 'fix' her eyes. She often cancelled her appointments if she was not coping well with depression. As therapy progressed, Ms. B began slowly began to show more insight with her condition from a holistic point of view, but the sessions of 45 minutes in duration were draining for both patient and therapist.

It seems possible that there is a relationship between Ms. B's visual problems and chronic depression. Did the depression cause the visual problem, or did the visual problem cause the depression? Are they completely independent of one another? Is the esotropia a symptom of her egocentricity and her need to keep her emotions within; a symptom of her inability to reference with her world with ease? One of the few times that the diplopia resolved was when Ms. B relaxed while watching TV and stopped thinking about herself and her diplopia.

Flach et al. and Carmody et al. describe significant esophoric postures compromising depth perception with the patient unsure of object location or their position in space. The volume of space able to be organised is severely compressed, slowing down visual information processing. A large number of saccadic eye movements are required to make sense of narrow visual samples, with the patient having to rely on memory (and one would think sequential memory) rather than simultaneous global perception of the scene as a whole. They

state very succinctly “perhaps a compressed visual space serves as psychological protection for individuals under stress”.¹

Treating the esotropia successfully may not rid Ms. B of her chronic depressive symptoms completely, however, it may help with her self esteem and let her concentrate on improving other aspects of her life. Perhaps she would find it easier to listen to other people talking to her and create stronger connections. The resolution of symptoms while relaxing and watching TV indicates that the distance diplopia may be resolved by relaxation.

Base-in fusion can be assisted by the implementation of visually associated relaxation activities. Sympathetic innervation due to stress, higher visual demand at near, and other psychological factors create a drive towards over-convergence, with the plane of convergence being in front of the plane of accommodation. Peripheral awareness is reduced with more emphasis on central vision (and self). Birnbaum² describes ‘look soft’ techniques, with procedures developing simultaneous awareness of both the central object of attention and volume of peripheral space, to aid in the development of base in ranges.

Visualisation activities while relaxing may also be of great benefit to increase base-in fusional ranges.² Visualising near and far objects can develop fusional ranges with the patient visualising an object close to them and feeling the convergence needed to align the eyes with that target, followed by visualising a far object and diverging out to see it. An aperture rule may be used with the target set at a base in level just beyond the capability of the patient. With eyes closed, visualising a scene of peaceful nature with large open spaces, feeling the warmth of the sun and awareness of a relaxed feeling moving through the body, and then keeping that feeling of relaxation and far, soft looking when the eyes are opened may immediately increase the divergence ability. These activities may also aid plus acceptance, helping to relax muscle tonicity and increase the vestibulo-ocular reflex (VOR) gain. I have also encouraged some myopic patients like this who wear contact lenses to decrease their prescription or under-correct by -0.50 to -0.75 while in their work environment and to wear over distance glasses for driving if required. It seems beneficial that these patients use as little minus as possible if they are myopic – just enough for their distance vision to be acceptable.

Movement is another way to reduce stress and the stress response, which in the case of Ms. B may be represented optometrically by her divergence insufficiency. Being deskbound with a dull job is most likely adding to her visual symptoms. Appropriate use of the Harmon distance should be adopted, with near work at a 20 degree incline and positioned the same distance as elbow to second knuckle of the middle finger from the eyes. Visual hygiene with regular breaks from near work, moving about the office, looking softly out a window, emphasising taking in as much of the view as possible, may all help to release the over active sympathetic nervous system.

Visual Imagery

Visual imagery (or mental imagery which encompasses visual, auditory, and motor imagery) has the ability to enhance treatment options for patients with mental or emotional disturbance. Imagery techniques are used within many fields to invoke feelings, sights and sounds of calm, and relaxed and happy conditions.³

Mental imagery can also have negative connotations. Visual imagery ability is negatively associated with post-traumatic stress disorder (PTSD) patients in that they are more prone to negative flashbacks.⁴ Intrusive mental images are a diagnostic characteristic of acute stress disorder, PTSD, and dissociative disorders. About 50% of patients with Major Depressive Disorder report that involuntary intrusive mental imagery is part of their condition, with a lack of positive imagery, especially future directed imagery (they cannot imagine something happening in the future that may bring them happiness).

Patients with schizophrenia and mentally healthy patients experience visual and auditory imagery to the same extent. Although there is similarity in the definition of mental imagery and hallucinations, the difference is that mental imagery occurs as part of our own inner thoughts, whereas in hallucinations the experience is that of someone else being in control or a voice talking to you rather than you talking to yourself. Mental imagery was also found to be very vivid in schizophrenics and their close relatives suggesting a higher predisposition towards hallucinations.⁵ Mental imagery was also found to be heightened in bipolar disorder and correlated highly with their current level of anxiety and depression.⁶

Patients with PTSD showed less anxiety when they exhibited better visual imagery ability.⁴ Awareness during visual imagery brings consciousness to one’s feelings, motives, drives, and power of belief system.³ Forrest discussed how as this awareness increases, as does the ability to release physical, mental and emotional blocks. Imagery is inversely proportioned to tension within the mind and body. Less able imagers are energetic and tense, often overwhelmed by internal thought, more verbal and more bound to the past with less ability to visualise, whereas imagers are generally calmer and relaxed. It is possible that anxiety would not exist with true relaxation.

Relaxation and visualisation work together well. A person can help enhance visualisation by first relaxing as much as possible. Muscles can be tensed and the person can look hard at an object, perhaps noticing the visual changes that also occur while looking hard. Feeling relaxed is then often easier as the feeling is coming from the opposite state. All the muscles can be relaxed with the person looking softly at something. This can be done by using imagery and used in vision therapy activities such as the aperture rule activity discussed earlier.

Attention focused on oneself may impair their capacity for true and accurate perspective. As dynamic mental practice can improve physical outcome it makes sense that positive

mental imagery may also enhance treatment for positive psychological and emotional outcomes.⁷ Replacing negative intrusive imagery with positive purposeful imagery has a role in the rehabilitation of patients, especially those with anxiety disorders and mood disorders including PTSD.

Lifestyle Factors Affecting Mental and Emotional Health

Patients such as Ms. B also bring about our involvement with other lifestyle factors. Optometrists who practice in a behavioural manner find themselves unable to ignore the other factors that are inflaming the patient's condition. The discussion of diet, light exercise, relaxation activities such as yoga and meditation, classes that teach correct abdominal breathing (yoga, pilates, and meditation all teach this skill that so many people perform incorrectly - stressed and anxious people usually exhibit fast and shallow breath), and small lifestyle changes are not usually the domain of optometrists. However, we have an obligation to remind our patients of other factors that may be inhibiting their rehabilitation and offer recommendations on where else they may seek help. This can be done by referral to another appropriate health practitioner and/or providing reading material and websites for the patient to peruse.

In particular, the link between gut health and brain disorders shows some strong new research. Gut microbiota has found to be compromised in people with chronic inflammatory and psychiatric conditions.⁸ Increased prevalence occurs in urban environments compared to rural environments, and in immigrants (as well as second generation immigrants) suggesting that maternal gut health is also a factor. With decreased exposure to micro-organisms, immunity and the ability to regulate inflammation is reduced. Research suggests that the mediators of inflammation adjust brain development, and a deficiency can lead to an increase in psychiatric disorders. Inflammation may also increase when psychosocial stress arises with a background of poor immuno-regulation and lead to an increase in mental and emotional disturbances.⁸

Gut dysbiosis has been explored in patients with autism, schizophrenia, mood disorders, and anxiety. Recent research and news from The Kavli Foundation at Columbia University states, "There are key developmental windows when the brain is more vulnerable because it's setting itself up to respond to the world around it. So, if mom's microbial ecosystem changes - due to infection, stress or diet, for example - her newborn's gut microbiome will change too, and that can have a lifetime effect. We've shown, for example, that a metabolite produced by gut bacteria is sufficient to cause behavioral abnormalities associated with autism and with anxiety when it is injected into otherwise healthy mice."⁹

A recent article from December 2014, discusses the use of nutraceuticals in treatment-resistant depression, including herbal medicines (*Hypericum perforatum* - St. John's Wort), omega-3 fatty acids, mineral supplements (in particular magnesium), folate and B vitamins, and the role of live

probiotic cultures. They elaborate that the microbiome in the intestinal tract may provide efficient therapeutic interventions for mood disorders.¹⁰

The Effect of Medications on Vision

Most medications come with a large list of possible side effects; knowledge of patient's medication through a comprehensive case history is important. Some of the visual side-effects include blur, visual disturbances, and difficulties focusing. Anti-depressants (e.g. Prozac, Paxil, Zoloft and Lexapro) which raise serotonin levels, reduce anxiety, and reduce obsessive-compulsive disorders may result in blurred vision and difficulty accommodating.¹¹ Older style tricyclic antidepressants (TCAs) (e.g. Amitriptyline - Elavil and Endep) are associated with dry eye syndrome and up to 1/3 experience blurred vision.¹² Anti-convulsants (e.g. Tegretol) which calm behaviour and lessen mood swings may cause vision impairments such as rapid eye movements. Anti-psychotics (e.g. Mellaril and Chlorpromazine (CPZ - also known as Largactil or Thorazine)) which reduce agitation, anxiety, and aggression may cause blurred vision. Anti-anxiety agents (e.g. Atavan, Valium and Xanax) may cause abnormal eye movements.¹¹ Patients using TCAs or anti-psychotics and have narrow angles should be monitored closely for narrow angle closure glaucoma. Topiramate (an anti-convulsant) may also cause an allergic type reaction in some patients whereby the lens and ciliary body are displaced, resulting in angle closure glaucoma.¹²

Flach et al. looked at the possibility of medication affecting the results of their investigations into visual perceptual dysfunction in patients with schizophrenia and affective disorders.¹³ They found that lithium had no influence on schizophrenic patients but significantly lowered amplitude of accommodation in patients with affective disorder. Patients taking neuroleptics also showed a greater delay in recovery of convergence in patients with affective disorder.

Mrs. CG, aged 35, presented wanting to try contact lenses as she had begun karate. She had a longstanding history of mental illness including schizophrenia and anorexia nervosa. She had recovered from anorexia nervosa 12 months prior. She was taking Lithium, Epilam, Seroquel, and Valium. Over the previous few months a new medication had been added to her regime - Chlorpromazine (CPZ), and Mrs. CG had been warned that this drug could cause muscle stiffness. Information on CPZ lists many possible side effects.¹² It may deposit in the ocular tissues when used for long periods and at high dosages, resulting in abnormal pigmentation of the eyelids, interpalpebral conjunctiva, and cornea. More rarely it can cause corneal oedema. It may also result in lenticular opacities and retinopathy.

Mrs. CG had noted that her distance vision had worsened lately even though her myopic distance prescription had been updated 8 months previously. She worked during the day on a computer fairly consistently. Visual acuity with the current

myopic prescription was 6/12 in the right (R) and left eyes (L). This had decreased from R6/7.5++ and L6/6 with Rx R-2.00/-0.50x115 and L-2.00/-0.25x85. The new Rx was R-3.00/-0.50x115 and L-2.75/-0.50x80. This is a significant myopic shift in 8 months for a 35 year old adult, regardless of high visual demands at near. There were no other apparent ocular health issues to explain the cause of this myopic increase. Mrs. CG planned to stop taking CPZ so we decided to delay the final prescription of the contact lenses until that time. Indeed, at a review after the cessation of CPZ, her spectacle and contact lens prescription reduced slightly and she is currently wearing contact lenses R-2.75 and L-2.50.

It is possible that this finding of sudden myopic shift is related to the drug CPZ. Ciliary spasm resulting in accommodative excess is a possible diagnosis and coincides with the side-effect of muscle stiffness. Another possibility could be some very mild lenticular changes resulting in a myopic shift. Notes on this medication state that muscle stiffness may be a serious side effect. Although other systemic muscle stiffness had not been noted by Mrs. CG, it was advised that she report this possible finding to her general practitioner

As systemic medication may have significant side effects that can affect the visual process and ocular health, conveying the importance of disclosing a medication regime is paramount. This should be done with care and consideration and to ensure that optometrists' patients understand that such a disclosure is confidential. This will allow better understanding and management of the findings and optometric data. For example, the patient may require therapeutic lenses to support an accommodation insufficiency, they may require monitoring of intra-ocular pressure, dry eye therapy may need to be discussed, and as in the case of Mrs. CG there may be a need to reassess the refraction to ensure stability before an appropriate prescription is dispensed.

The Effect of Stress Relieving Lenses

Stress relieving lenses can be used for the relief of symptoms associated with visual stress due to high visual demands, but also to produce physiological changes in mental and emotional disturbances.

Master D, aged 11, presented with Tourette's syndrome. His tics were usually ocular in nature, with large blinking episodes. Of interest was his family history; his father was diagnosed with schizophrenia as a young adult (not a patient at the same practice). Master D had reduced binocular function, suppression of the RE with mild amblyopia, convergence insufficiency, and reduced stereopsis. There was low and equal hyperopia. A vision therapy program had been implemented to address these issues.

Although Master D showed no immediate positive response to plus lenses, he often appeared to be visually stressed during vision therapy sessions involving near tasks. The vision therapist recommended that I review his

"focussing". Low plus lenses were trialled for one week. The patient, his mother, and his teacher noticed a significant decrease in the tic presentation. We decided to trial for another week without glasses. Master D reported his eyes were much less comfortable. Another week with glasses again showed better visual comfort with reading and near work and significantly fewer tics. Although the positive effect of the low plus lenses may be the result of a novel and/or placebo effect, observation of decreased ticing by both mother and teacher suggest that stress relieving lenses are providing a reduction in visual noise and an increase in information quality. Low powered plus lenses may decrease muscle tonicity, increase the plane of accommodation to that of convergence, and make the object in space appear as though it is further away by increasing the convergence of light with SILO.¹⁴

Kraskin discussed the appropriate stress relieving lens power can be obtained by the use of stress point retinoscopy – a method where the stress point of an individual is seen as a physiological brightening followed by a dulling of the near retinoscopic reflex. The appropriate lens may also be obtained by probing the effect of visual skills within the analytical examination such as stereopsis, balance between positive and negative accommodation, and near point of convergence.

In hindsight, probing the response of yoked prisms would also have been beneficial and may have produced an immediate positive reaction to stereopsis, or improvement of binocular vision asymmetries within the visual system for Master D. This patient showed suppression and mild amblyopia of the right eye without any refractive cause. The use of lateral yoked prisms may have produced a change in the patient's perception of space, encouraging more efficient binocular vision and stereopsis.¹⁵ Yoked prisms are usually prescribed if a finding of improved performance is found in one direction and/or a decrease in performance is found in the opposite direction. Kaplan uses activities such as pursuits (sitting and standing), ball catch, balance board, walking rail, and screen watching (seated and standing) to assess the behavioural and postural changes within an individual.

It is of interest that Kaplan and Kraskin use yoked prisms in different ways. Kraskin uses disruptive yoked prism to create disorganisation within the visual system, to create a reduction in performance and to promote re-organisation of the visual process.¹⁶ Kaplan uses low powered yoked prism in prescribed glasses in treatment of spatial vision problems when an improvement in performance is seen.¹⁶ He also calls these ambient prisms which effectively alter the perception of our ambient visual process. Use of yoked prisms has led to improvements in the management of psychiatric patients with spatial disorders in conjunction with a complete vision therapy program to retrain the patient's understanding of their visual process.

Table 1. Comparing Failure of Visual Skills in Emotionally Disturbed Children Compared to the Normal Population

Skill	Failure in emotionally disturbed children	Failure in normal population of children
Saccadic fixations	53.7%	16%
Pursuit fixations	43%	N/A
Distance visual acuity	28.5%	10.6%
Near visual acuity	20%	6.4%
Convergence	23.4%	4.6%
Stereopsis	23%	16.6%

Anxiety, Emotional Disturbances and Vision Problems Affecting Learning

Recently, I have had discussions with a local psychotherapist who specialises in treatment of anxiety in children. She started to feel that many of her young patients were actually suffering with visual afflictions and that this was the cause of their anxiety. She had referred several of her patients for visual assessment and noticed that after treatment (with either lenses and/or vision therapy) their anxiety was greatly reduced or even resolved. She felt that often their anxiety began in school with the increased demands of learning to read earlier and the difficulties associated with lower self-esteem after continuing to show slow progress. She was frustrated that many of these young children had not had a full developmental visual assessment and were being referred to her unnecessarily.

Children with visually related learning problems may be anxious about their school performance and show this as general anxiety. They may have low self-esteem and poor self concept – feelings about themselves and their families.¹⁷ Emotional and psychological problems may cause children to appear hyperactive, tense, and sometimes depressed. They may have difficulties with attention and concentration. Environmental factors, family dynamics, exercise, diet, and sleep quality should also be investigated in these children in addition to their visual efficiency and visual processing.

A study from a school for emotionally disturbed children showed significant visual development issues; 50% had visual perceptual motor difficulties which included visual motor integration, visual motor development, and form reproduction.¹⁸ Other visual skills were also significantly less efficient than in children without emotional disturbance (Table 1).

Some of the children referred by the psychotherapist required hyperopic corrections or use of therapeutic lenses to support accommodative insufficiency. Others required vision therapy for visual spatial dysfunction, oculomotor dysfunction, convergence insufficiency, or visual processing dysfunction. How easily would it have been to eliminate months and perhaps years of anxiety if these children had first been seen by a behavioural optometrist with special interest in management of vision development?

Conclusion

As the understanding of the possible causes of mental and emotional disturbances improves, the afflictions become less stigmatised within society, and with better communication between health professionals, optometrists will need to be aware of the issues that may affect the visual process and ocular health of such patients. A management plan through the patient's general practitioner or case management mental health worker must include appropriate referral to eye care professionals.

Optometrists have a significant role in patients with mental and emotional disturbance. This is best achieved by:

- Understanding the psychological profile of patients with mental and emotional disturbances.
- Establishing a rapport that enables the patient to trust and confide in the optometrist as part of their mental health care.
- Considering the possibility of visual and ocular health issues caused by medications.
- Considering the higher risk of physical diseases such as diabetes that may be affecting ocular health.
- Regard the findings of binocular vision and eye movements, peripheral vision, and visual spatial processing and correlate these findings with mental and emotional status.
- Communicating findings and establishing a management plan that is easily understood by the patient and other health professionals or care taker if required.
- Following up with regular review as required.

Finally we must consider that by enhancing the flexibility of the visual process and improving ocular health we may be able to help our patients improve their overall sense of wellbeing.

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Muller E. Role of Optometry in the Management of Vision and Ocular Health of Patients with Mental and Emotional Disturbance: Part 2. *Optom Vis Perf* 2018;6(1):25-30.

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