

VISUAL DYSFUNCTION in CHRONIC FATIGUE SYNDROME

Behavioural Optometric Assessment and Management

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Abstract

The characteristics, and visual and ocular signs and symptoms, of 141 patients with chronic fatigue syndrome referred for optometric assessment are reported. Visual problems of CFS patients are discussed, as well as a review of abnormal results commonly encountered in optometric examination.

The options for behavioural optometric management of the visual manifestations of CFS are discussed, including subjective correction, base-in prism, yoked prisms, progressive lenses, binasal patches, tints, vision therapy and ocular lubrication therapy

Key Words

chronic fatigue syndrome, visual symptoms, prism, binasals, vision therapy, vision training

There are few references in the literature to visual and/or ocular disturbances in CFS even though visual symptoms are common. Ocular symptoms have been quantified, and are significantly more common than in control groups.¹ Komaroff and Buchwald estimated from their own experience and from reports in the literature the frequency of symptoms in CFS patients; the symptoms which may have visual implications, and their frequency, were estimated as in Table 1.²

Population Study

Age, sex and occupational characteristics of 141 CFS patients referred to this practice for visual examination between January 1992-January 1993 are detailed in Tables 2, 3 and 4. The majority of patients had complained to the referring doctor of bothersome visual complaints, but some had not considered their visual problems to be significantly affecting their day-to-day function, or may not have mentioned any visual problems at all.

Symptoms were assessed using a CSF questionnaire (Appendix 1) completed by each patient. The prevalence of each reported symptom is detailed in Table 5.

VISUAL AND OCULAR SIGNS

The average age of CFS patients in the study of Komaroff and Goldenberg was 37 years, with the age of onset ranging from 11 to 60 years.³ The patients in this study ranged in age from 8 years to 69 years.

Table 1.
Visual symptom frequency in
CFS patients.

Symptom	Frequency (%)
Fatigue	100
Impaired cognition	50-85
Depression	50-85
Anxiety	50-70
Post-exertional malaise	50-60
Visual blurring	50-60
Headaches	35-85
Dizziness	30-50
Dry eyes	30-40
Sleep disorder	15-90

About 70% of the patients in their survey were female, similar to the practice profile detailed here, where 64.5% were female. The highest incidents of CFS in the present study was found in the 41- to 50-year age group.

Komaroff and Goldenberg found approximately 85% of the patients studied had chronic illness following the sudden onset of acute "flu-like" illness characterised by fever, pharyngitis, adenopathy, myalgias, and related symptoms.³ Medical history tends to show a strikingly high frequency of atopic or allergic illness (50%-70%). An organic disease is diagnosed in 20%-45% of chronically fatigued patients.

Ocular-Visual Disturbances

The visual symptoms of diagnosed CFS patients presenting in my practice in the last 12 months have been almost uni-

versal but amazingly similar from patient to patient. Ocular and visual disturbances can be observed by semi-objective means, and reflect dysfunctions in ocular movement (particularly in saccades and convergence), ciliary muscle function, as well as CNS processing of visual information. The symptoms generally match in degree the severity of the fatigue. It appears the majority of people develop the disabling visual disabilities and symptoms when pathological fatigue exists as opposed to normal fatigue. They appear physically unable to make the compensations they would generally make with normal fatigue following adequate rest or removal from the situation causing the fatigue.

VISUAL SYMPTOMS

The ocular signs and symptoms of CFS have not been considered to be a major part of this condition in the past, yet it becomes very obvious when working with these patients that the ocular system is very much affected by, and in turn affects, this systemic condition.

The visual symptoms typically encountered with CFS patients include:

- Blurred or foggy distance and/or near vision. Blur tends to fluctuate according to the state of the fatigue at the time. They complain of blurred vision even when their acuity is 6/5.
- Difficulty focusing from distance to near and/or near to distance.
- Slowness or inability to focus on objects, particularly at near.
- Difficulty tracking lines of print. Patients seem confused and distracted by the lines of print above and below where they are reading.
- Poor short-term memory and concentration (generally) with reading being markedly affected.
- Diplopia or ghosting of images.
- Problems with peripheral vision; patients complain of not seeing objects in their side vision, and of continually bumping into things and veering. Some say they feel like they have tunnel vision.
- Misjudging distances, clumsiness, poor balance and coordination. Difficulty driving due to problems judging distances.

AGE	0-10	11-30	31-40	41-50	51
	3	15	38	54	31
	2.1%	10.6%	27%	38.3%	22%

Table 3. Sex characteristics of 141 CFS patients.			Table 4. Occupational characteristics of 141 CFS patients.		
SEX	Female	Male	OCCUPATION		
	91	50	Professional	Skilled	Unskilled/Pens/Student
	64.5%	35.5%	25	31	85
			17.7%	22%	69.3%

SYMPTOM	No.	%
Headache	73	55.8
Photophobia	76	53.9
Distance blur	63	44.7
Near blur	93	65.9
Near/far/near blur	56	39.7
Poor memory	84	9.6
Visuo-spatial/balance/coordination	92	62.2
Dizziness/difficulty with moving objects	54	38.3
Poor concentration	111	78.7
Sore eyes	50	35.5
Diplopia	14	9.9
Spots/floaters/halos/flashes	29	20.6
Stopped driving	18	12.6
Stopped work	45	31.9
Neck pain	38	26.9
Known psychiatric/depression problems	22	15.6

- Dizziness and inability to tolerate looking at moving objects.
- Spots, flashes of light, floaters, halos.
- Intolerance to light (glare).
- Eyelids feel heavy and at times difficult to keep open.
- Grittiness, burning, dryness, or itching are common complaints. Patients complain of sore eyes usually becoming worse as the day progresses.
- Headaches often increasing when reading, concentrating visually, and driving.

In many cases almost all of these symptoms occur, producing varying degrees of disability. These patients suffer typical neurological phenomena which are important fatigue symptoms. They have sensory intolerance and appear to have a degree of inability to suppress background sensory events from reaching a distracting level in consciousness. With the low muscle tone associated with their fatigue they

tend to have a high level of conscious sensory awareness. Their oculomotor movements are very slow. There appears to be some disturbance in their attention and their ability to selectively attend. In an individual with CFS these phenomena can affect one or more systems, i.e., visual, hearing, smell, superficial sensation, deep sensation (muscular/joint pain), or autonomic sensation (awareness of breathing/heart beat, etc.). This sensory intolerance can be brought on or intensified by physical or cognitive activity; they are essentially in a state of sensory overload.

Heightened sensory awareness in the visual system presents as patients saying they are highly aware of all details in their entire visual field, but they do not have the ability to either suppress parts of these details or to emphasise one area relative to the rest of the visual field. In my opinion it is due to a difficulty with figure/ground perception or difficulty with simultaneous

central and peripheral processing of visual information. One patient's visual intolerance was so severe he developed a great fear of opening his eyes, so a large part of his day was spent with his eyes closed. Several others have explained how they need to physically hold their head when talking to people or concentrating visually. They may comment that "seeing" is exhausting. Many CFS patients cannot tolerate shopping centres; they experience visual confusion and disorientation.

The visual examination is used to evaluate the coordination between the autonomic and motor-nerve systems at the eye level. There is frequently an apparent mismatch between the two systems with resultant changes in perception, which ultimately causes changes in total behaviour. The examination also indicates the degree of compensation needed to sustain single binocular vision at the expense of other physiological systems, since the autonomic nervous system controls the visual system as well as the heart, lungs and gastro-intestinal system. The visual analysis helps to evaluate the visual-motor, gross motor and perceptual behaviour patterns of the patient.

OBJECTIVE OCULAR FINDINGS

Objective ocular findings may include:

- Poor oculomotor control is evident when observing motilities, particularly saccadic eye movements. Saccades are very slow (obvious saccadic latencies) with marked jerky movements. Head and neck movements are marked in relation to eye movements. Saccades often underreach the target. Conscious effort goes into changing fixation as if it is hard to let go. Pursuits are not smooth and cannot be done quickly. Pursuits tend to lag, and a jump saccade is required to catch up. Discomfort and often nausea is associated with saccadic and pursuit eye movements.
- Most commonly patients demonstrate exophoria, greater at near (often 8 exo), usually with a slow recovery; the exophoria may not appear high due to a long-term compensation process. Some present with intermittent or alternating exotropia at near. Occasionally high esophoria is found at both distance and near.

- Remote nearpoint of convergence is usually observed, with slow recovery. This test may be quite painful.
- Reach/grasp/release shows a marked decrease in the patient's ability to reach and grasp after release. One eye usually diverges without the patient being aware. Patients often complain of nausea, significant discomfort, or dizziness when performing this test.
- Near/far/near fixations, commonly show poor convergence at near with one eye usually diverging. Such vergence changes are typically very slow and often uncomfortable to execute, with sometimes an associated tendency to use raised eyebrows and wide open eyes to assist in changing to far.
- Extremely low and sometimes almost non-existent base-out fusional reserves at near are not uncommonly measured, as are usually, but not always, low ductions at distance.
- Poor vergence flexibility (12 out/8 in). Inability to fuse 12 out or to repeat it.
- Possible fixation disparity (up to 4 base-in) at near.
- Suppression of one eye at near is common.
- Abnormally high lag of accommodation is almost invariably discovered at near retinoscopy. Reduced amplitude of accommodation and facility are common. Common difficulty clearing plus. High + AC/A ratio.
- Constricted peripheral fields on the Humphrey Visual Field Analyser are common. In my experience, treatment with lenses and vision therapy produces marked improvements in fields. In my opinion there are probably several factors involved, including improved central/peripheral processing and sensory-motor coordination, and hence heightened attention.
- Staring appearance; low blink rate and incomplete blinking.
- Small pupils.
- Sensitivity to lights.
- Tear film and ocular surface abnormalities. Low tear break-up time (BUT) is frequently observed, as is rose bengal corneal staining (frequently inferior cornea due to dryness), and reduced Schirmer test findings, producing a

keratoconjunctivitis sicca presentation.

- Low grade chronic allergic conjunctivitis.
- It is not uncommon to find a visual midline shift in these patients, particularly if they have been diagnosed with fibromyalgia. These patients often develop significant postural problems which affect balance.
- Posturally, CFS patients often tend to sit with the buttocks well forward on the chair with their shoulders half way down the chair in a semi-reclined position (typical exo posture).

MANAGEMENT

Behavioural optometric management of the visual manifestations of CFS is best provided utilising the following treatment options:

- Best subjective correction for distance and near. Patients respond favourably to low plus lenses at near.
- Base-in prism (1/2 - 2 base-in both eyes) often provides immediate relief, particularly for near, but also greatly reduces the severity of the visuo-spatial symptoms, sometimes completely. Patients generally report things look brighter, they can see more, concentrate better, and neck pain and tension (including headaches) have been relieved. They often say the foggy or cloudy feeling in their head has gone and that they can read for longer periods.
- Yoked prisms can sometimes produce dramatic changes in some patients. Base-up yoked prism tends to be most beneficial for the exo patients. Where base-up prism is indicated I find that over time, as the patient improves, they are more comfortable changing to base-in prism. Over a period of time, base-up prism may produce a feeling of compression, and some patients will report that, while they need their glasses on, they feel discomfort as if they need to take them off. Base-up causes their eyes to move down in a forced accommodative-convergence position that possibly causes the initial discomfort. Changing to base-in gives them the feeling of release of tension in their body generally, and especially the upper body. Where base-down yoked prism has been prescribed I have not found the need to change prism. Horizontal yoked prism

has been successful where indicated for midline shift, with marked reduction of fatigue symptoms. Disruptive yoked prisms are used in therapy and are invaluable in rehabilitation. Yoked prisms are prescribed, using the direction which improves walking ease and comfort, and ball catching.

Fibromyalgia patients often require the use of base-down yoked prism to help with balance because of the typical head forward posture which they develop. Fibromyalgia patients frequently present with marked midline shift and a weakness down one side of the body (most often the left side). They have significant balance problems tending to lean and veer to one side, which can mimic a stroke. Lateral yoked prism is used to realign midline. Base-down yoked prism may be needed in conjunction with lateral prism to lift their chin, promote extension and alter their centre of gravity. Co-management with a physiotherapist combining lens therapy, Alexander techniques, and physiotherapy can produce a major reduction of patient symptoms.

I find it interesting that in the fibromyalgia group of patients a significant proportion have a history of one or more of the following: strabismus, amblyopia, anisometropia, eye surgery for strabismus (often multiple), long-standing binocular vision problems, nystagmus, whiplash or closed head injury. All of these conditions have significant potential effects on body posture. The long-term effects of poor body posture on the overall health of the individual have been well documented, and visual dysfunctions appear to be a major contributing factor to poor body posture in CFS patients.

- In prescribing lenses for CFS patients, the lenses of choice in my experience are progressive lenses. I use them as supportive lenses to reduce the effort of focusing from distance to near, providing progressive clear vision. The effect of the peripheral distortion is used therapeutically to stimulate peripheral (proximal) awareness and to consequently aid in simultaneous central/peripheral processing. I frequently combine them with base-in prism. These patients notice profound improvement in their vision almost immediately and feel very uncomfortable without their lenses. With time,

therapy, and improvement in their health they may become less dependent on their lenses but tend to need them during relapses and when feeling tired.

- Binasal patches (worn intermittently) are a useful tool in my experience, as they tend to make the patient interpret space as larger and facilitate increased peripheral awareness. They reduce the patient's feeling of compression and tunnel vision. Bitemporal patches are sometimes needed in therapy procedures.
- Tints are regularly used because of the increased sensitivity to light. In patients with psychiatric problems as well (panic disorders or depression), the tints often provide a calming effect.
- Vision therapy techniques appear to play an important role in the visual rehabilitation of CFS patients. The therapy emphasises oculomotor control, awareness of accommodation and convergence dysfunction, awareness of sensory motor dysfunction and poor blink rate. It is important to develop greater self awareness by paying attention to sensory input to enlarge the field of awareness; with guided development of patient sensitivity and ability to pay attention to sensory experience, there is a noticeable improvement in performance. By using awareness of breathing (e.g., with eye movements), kinaesthetic, auditory, and proprioceptive as well as other sensory feedback, the patients very quickly register improvement in concentration. Concentration is a function of an individual's ability to receive and process sensory information. As time and space are "real" constants, lenses, prisms and a metronome are ideal tools for therapy in developing effective time-space interaction and concentration.

As patients use vision more effectively they move more quickly. They may arrive on the first visit being supported by a cane or family member; following treatment of visual dysfunctions they can often walk unaided. The patients are usually astounded at how difficult some very simple visual tasks are to accomplish. Of course not all patients are well enough to attempt therapy, so this has to be assessed before

they commence. Care should be taken with the introduction of therapy in relation to the severity of the fatigue. While it is difficult to understand how an individual could suffer such severe fatigue, I have had several patients who have had to spend the following day in bed after doing simple eye movements and eye stretches.

CFS patients tend to find great relief following treatment, but because the illness has remissions and exasperations, when they experience a relapse they may regain some of the visual symptoms. However, following vision therapy, patients report they recover from relapses much more quickly than before.

Many patients have made the comment that they believe a large proportion of their fatigue had been due to their visual problems. They appear to have to relearn the visual skills. If we consider for a moment that 60%-70% of all sensory nerves in our body come from our eyes, it makes sense that if we enhance the performance and reduce the fatigue within the visual system there can be related and improved performance in other sensory areas.

- Lastly, ocular lubrication therapy is often needed to treat the dry eye problem and symptoms, and to eliminate the corneal staining. I use unpreserved products and recommend they be used at night (e.g., Celluvisc) and qid (e.g., Refresh). Warm compresses may also provide some relief. Many of these patients have significant allergy problems and I will also proffer advice on relief of allergic symptoms.

CONCLUSION

Chronic fatigue syndrome has been estimated to have a prevalence of 37.1 cases per 100,000 in an Australian population.⁴ This carries a significant cost to the individual, the government and the community, conservatively estimated at \$59 million annually.⁵ Individuals rely on sickness benefits for life.⁶ In general there is no well-known treatment that is beneficial to the majority of patients.⁷ It becomes important, therefore, that any treatment of these patients that can be shown to be of benefit in the majority of cases is documented and further investigated.

Because CFS is a real illness of increasing prevalence in the community, and as fatigue itself becomes better understood, it is important that optometrists are

not only fully informed about the condition itself, but also cognisant of the ocular/visual disturbances for which we can play an important role in treatment and rehabilitation. A thorough case history as well as a complete binocular vision workup is essential to develop efficacious optometric management of the ocular and visual effects of CFS.

Many CFS patients have consulted other practitioners without any success, and are capable of being devoted patients in your practice. The simple knowledge that the visual symptoms are part of the illness and can be treated is a great relief to most people, as many have previously seen a psychiatrist because of their concern that they are losing their sanity.

Following optometric intervention, many patients have been able to recommence their studies, regain or continue with employment, begin to read (after having stopped completely), and recommence driving. For some patients the improvement is not so marked, but almost all patients report significant improvement in their concentration and reading.

Neurological insults or dysfunction frequently produce visual dysfunctions and can manifest themselves as psychological sequelae, such as anxiety and panic disorders as well as spatial dysfunction

affecting balance and posture. If the research is correct in indicating the midbrain is the area of dysfunction, the visual problems manifesting in these patients relate to the visual processing problems at the levels of midbrain and at the higher cortical processing centres. Whether the visual symptoms are caused primarily by a psychiatric state or a neurological insult as a result of organic illness is not known. The visual symptoms appear the same even if there is no evidence of psychiatric illness.

Behavioural optometrists are already aware of the visual symptoms in psychiatric disorders (e.g., anxiety attacks and panic disorders) and the benefits optometrical intervention can have in the relief of these symptoms. The visual dysfunctions in CFS are similar regardless of whether there is co-existing psychiatric condition (primary or secondary) or CFS alone. The symptoms and findings are also similar to those found in head trauma, suggesting further support for a neurological explanation for CFS.

Evaluation of the clinical care provided for approximately 150 patients diagnosed with CFS is continuing in our practice to elucidate the management strategies to most effectively eliminate or reduce the visual manifestations of chronic fatigue syndrome.

APPENDIX 1. CHRONIC FATIGUE SYNDROME QUESTIONNAIRE

We are interested in determining the possible ocular/visual manifestations of Chronic Fatigue Syndrome (CFS). Please help by filling out this short questionnaire. We need the input from both CFS patients and their non-CFS afflicted relations and friends. The top three lines are optional and will remain confidential to us alone. Thank you.

NAME

ADDRESS

PHONE

CITY

STATE CODE

AGE SEX: M/F

OCCUPATION

HOBBIES

CFS? YES ___ NO ___ TIME OF ONSET

CAUSE OF CFS IF KNOWN

DO YOU WORK ON A COMPUTER? YES/NO HOURS PER DAY ___

DO YOU DRIVE? NOW: YES/NO; IN THE PAST (PRE-CFS): YES/NO

DEGREE OF DEBILITATION (10%, 50%, 75%, 100%)

HAVE YOU STOPPED WORK? YES/NO; OR LESSENERD WORK HOURS? YES/NO

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ARE YOU HAPPY/COMFORTABLE WITH YOUR PRESENT GLASSES? YES/NO

DO YOU EXPERIENCE ANY OF THE FOLLOWING? (CHECK ALL THAT APPLY, PLEASE):

- A. BLURRY VISION AT DISTANCE
- B. BLURRY VISION AT NEAR
- C. FLUCTUATING BLURRINESS OF DISTANCE/NEAR VISION
- D. FOGGY OR MISTY VISION
- E. TROUBLE FOCUSING FROM DISTANCE TO NEAR
- F. TROUBLE FOCUSING FROM NEAR TO DISTANCE
- G. DOUBLE VISION (TWO SEPARATE IMAGES)
- H. SHADOWING OR GHOSTING OF VISION (TWO IMAGES TOUCHING)
- I. POOR MEMORY
- J. POOR CONCENTRATION WHEN READING/LISTENING/OTHER TASKS
- K. POOR COMPREHENSION WHEN READING
- L. TROUBLE JUDGING DISTANCES OR DEPTH
- M. POOR BALANCE OR COORDINATION PROBLEMS
- N. TROUBLE ADJUSTING TO MOVING OBJECTS
- O. DIZZINESS

HAVE YOU EXPERIENCED AN INCREASE IN THE FOLLOWING? (CHECK ALL THAT APPLY, PLEASE):

- A. HEADACHES YES/NO
 - 1. WHEN READING
 - 2. WHEN DRIVING
 - 3. OTHER

INCREASED SENSITIVITY TO LIGHT (GLARE)

SPOTS OR FLOATING OBJECTS

- 1. BLACK SPOTS
- 2. WHITE SPOTS
- 3. COLOURED SPOTS/LIGHTS
- 4. FLASHING LIGHTS
- 5. OTHER TYPES/SHAPES OF SPOTS OR LIGHTS

HALOS AROUND LIGHTS? WHITE/COLOURED

DO YOUR EYES FEEL MORE? (CHECK ALL THAT APPLY, PLEASE):

- GRITTY
- TEARY
- BURNING
- ITCHING
- DRY
- SCRATCHY
- SORE EYES IN THE MORNING, IMPROVING AS THE DAY PROGRESSES
- EYES GET PROGRESSIVELY MORE SORE AS THE DAY PROGRESSES
- OTHER SENSATIONS

LIST ANY OTHER PROBLEMS RELATED TO THE FUNCTION OR COMFORT OF YOUR EYES THAT YOU THINK HAVE OCCURRED SINCE THE ONSET OF CFS.

NON-VISION RELATED SYMPTOMS

- A. DO YOU SUFFER COLD FEET? YES/NO (IF SO, DO YOU WEAR BEDSOCKS? YES/NO
- B. DO YOU SUFFER NAUSEA/DIGESTIVE PROBLEMS? YES/NO
- C. DO YOU HAVE DIFFICULTY BREATHING? YES/NO
- D. HAVE YOU EXPERIENCED AN INCREASE IN SWEATING SINCE ONSET OF CFS? YES/NO
- E. DO YOU HAVE POOR SLEEP PATTERNS? TOO MUCH/TOO LITTLE
- F. DO YOU SUFFER FROM NECK TENSION OR NECK PAIN? YES/NO
- G. HAVE YOU BEEN DIAGNOSED AS HAVING FIBROMYALGIA? YES/NO

CURRENT MEDICATIONS/VITAMINS