Chronic Fatigue SYNDROME

Optometric Clinical Presentation and Management

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Abstract

The visual and ocular signs and symptoms of chronic fatigue syndrome (CFS) are often non-specific and puzzling, and may range from mild accommodative dysfunctions or significant convergence insufficiency to debilitating reduction of the ability to use vision to perform normal daily tasks.

Patients already diagnosed with CFS may present for optometric care with visual complaints which they do not relate to their CFS condition. Other patients may seek care for visual symptoms which should alert the behavioural optometrist to the possibility of chronic fatigue syndrome.

Three cases are discussed which demonstrate the varying presentations of CFS in optometric practice.

Key Words

chronic fatigue syndrome, visual symptoms, visual signs, accommodation

The syndrome characterised by chronic and debilitating fatigue, muscle and joint pain and weakness, and impaired concentration and memory, has been variously termed chronic fatigue syndrome (CFS), chronic fatigue and immune dysfunction syndrome (CFIDS), postviral syndrome (PVS), or myalgic encephalomyelitis (ME). The aetiology is still not well understood, and as there are often no outward physical signs of the condition, sufferers are often accused of malingering or hypochondria; since many have led previously high level activity and stress lifestyles, the popular press has coined the term "yuppie flu" to describe a condition which is estimated to affect more than 70,000 people in Australia. (Lloyd et al conservatively estimate the incidence in Australia at 376 cases per 100,000)[1]

Macintyre suggests the condition she terms myalgic encephalomyelitis may have an incidence of one in 1,000,[2] usually following a viral infection. Other triggers may include a recent history of immunisation, physical, mental or emotional stress; bacterial infection; surgical procedures; or exposure to neurotoxins or organic chemicals.[1,3,4] Macintyre suggests that ME is "a neurological condition, with disturbance of function in the midbrain, hypothalamus and limbic system. Single photon emission tomography scans show reduced cerebral blood flow, and electronystagmograms have revealed cerebellar dysfunction in some cases."[2]

She lists the ocular symptoms as including:

- Transient blurring of vision at near or far
- Intermittent diplopia (rare)
- Extreme sensitivity to visual patterns or movement
- Floaters
- Pain or redness (less common)

Potaznick and Kozol have reviewed the ocular manifestations of CFS, grouping them into four categories:[5]

1. Functional: accommodation and convergence
2. Neuro-sensory: headaches, photophobia, and central-peripheral integration disturbances
3. Entoptic phenomena: floaters, etc.
4. Anterior segment symptoms: tear-related, etc.

They strongly emphasise the need for eyecare practitioners to carefully evaluate patient symptoms, and elicit a comprehensive history with a high level of suspicion for the possibility of CFS in patients who present with a puzzling range of ocular and possibly systemic symptoms.

Three cases are discussed which demonstrate the varying presentations in optometric practice of CFS.

Case I

M is a 10-year-old American female who presented in May 1993 for urgent optometric assessment of recent constant difficulty seeing at distance and near, associated with poor balance.

She had been experiencing lethargy, joint stiffness, headaches and pain for four months following travel in the United States, where she suffered from a presumed virus, as did her family. Subsequent blood tests were interpreted as normal, and the rheumatologist recommended a psychological consult for a presumed functional disorder, noting in her report that she ".... continued to show a very definite pattern of behaviour that would be consistent with her having a functional illness, i.e., her need to have symptoms was very strong, and seemed to be dictating everything that she did and the manner in which she behaved. Hers was the very typical behaviour of a girl who had a great need to be 'ill' .... I suspect she has a form of 'school refusal,' whereby there is something deeply distressing her about school attendance...."

She has been investigated for allergies to sugar, wheat and yeast, and was currently taking cod liver oil tablets, vitamin C and Panadol.

M had great difficulty walking from the reception area to the consulting room, walking on her heels and having to hold onto chairs and door frames to prevent herself from falling backwards.

When seated in the examination chair she could not see any letters of a normal Snellen or Bailey-Lovie low vision chart; acuity at six metres and 40 cms appeared to vary dramatically and rapidly, with best estimates obtained at distance of acuities of 6/360 each eye.

Objective examination was remarkable for the extreme accommodative variation observable on retinoscopy and ophthalmoscopy, with the reflex changing rapidly between Plano and approximately -6.00 dioptres. No subjective assessment of refraction, accommodation or vergence was possible. During the accommodative variations she did not demonstrate any binocular deviation from orthotropia. External examination revealed no abnormalities, pupil reactions were essentially normal, with no afferent defect detectable, although pupil diameter varied in parallel with the variation in accommodation. Ophthalmoscopy revealed no specific pathology.

The possibilities of chronic fatigue syndrome and Lyme disease were discussed with the patient and her mother, and she was referred to an ophthalmologist experienced in Lyme disease for elimination of the possibility of ocular manifestations of Lyme disease and blood workup.

He found no indications of Lyme disease, reporting normal pupil reactions and colour vision, good stereopsis, and normal fundi and optic discs, with no significant refractive error noted with cycloplegia. The option of a visual evoked response to eliminate the possibility of optic nerve involvement (although pupils, colour vision, and optic disc appearance were normal) was offered but deferred at the time. He concluded she was probably malingering.

She reported one month later that she had been assessed by a paediatrician experienced in CFS as having had glandular fever in the last year (diagnosed from blood tests), and was currently being checked for lupus; amino acids had been added to her multivitamin therapy. She was essentially confined to constant bed rest.

Four months later she reported being able to read at 10 cms for the previous month, but she experienced sore and red eyes after reading. She still experienced overall headaches, and distance vision was still severely blurred. Ocular health evaluation was still unremarkable. Acuities remained approximately 6/360 each eye. Retinoscopy was extremely variable from +1.00 to -2.00 with a two dioptre cylinder axis 180. No prescription made any difference to her acuities. MEM retinoscopy was variable with approximately Plano/-2.00 axis 180 at 7 cms reading distance. Pursuits were smooth and full with trace midline pause, saccades full and accurate. She responded well to the antisaccade test with trace pause before a correct response. A Confrontation finger-counting fields were apparently normal in all four quadrants of both eyes.

Trial of lenses or yoked prisms of magnitudes to 20 prism dioptres did not produce any change in stability of posture, visual function or retinoscopic stability.

One month later her mother reported by telephone M had experienced a severe and incapacitating headache in the occipital region, which suddenly ceased, with vision improving considerably. In the previous week she had been able to walk to a limited degree. She was currently receiving hydrotherapy and physiotherapy and had ceased multivitamins two weeks previously to commence a programme of naturopathy.

Two months later examination results were as follows:

Distance acuities:	6/6 R & L
Phorias	3m: 2-4 exo
(Howell card)	40 cm: 6 exo
Stereo (Titmus)	40"
NPC	5 cm
#4	+0.75 sphere R & L stable and bright
#7	R +0.75/-0.25*180 L +0.50/-0.12*180
#10	23/8
#11	8/4
#14B	+1.00
#16B	26/10
#17B	14/12
#20	-2.50
#21	+2.75

Ocular health evaluation was unremarkable.

No spectacles were prescribed.

Case II

S is an 8-year-old white female who had been previously diagnosed by blood tests as having "post-viral syndrome" secondary to Cytomegalovirus in 1992, and had experienced a recurrence of depression and insomnia in 1994; both times she was prescribed rest and multivitamins. She had also been diagnosed with cardiac sinus arrhythmia, and exercise induced asthma.

She presented for optometric assessment in relation to complaints of squinting at the TV and when reading for the last 12 months; she reported the board and reading blurred at times. A previous optometric consultation elsewhere had suggested "overfocusing." Visual analysis was as follows:

Acuities	6m: R6/9 L6/9
Phorias	3m: Ortho
(Howell)	33cm: Ortho
MEM retinoscopy	+0.75++
R & L	loose

+0.75 OU provides a more stable reflex, but it is still loose and variable

Pursuits NSUCO: 5555; full, smooth and sustained

NPC to 5cm

Near-far change: Generally accurate, although L fatigues and tends to lag on ingaze

MEM +/-2.00: Can clear +2 in one-two seconds, cannot clear -2 to any degree

Ocular health evaluation was unremarkable

#4	R+1.00 L+1.25
#7	R+0.50 L+0.50/-0.25*180

#10	8/6
#11	7/4
#14B	+1.25
#16A/B	X/10/2
#17A/B	16/18/10
#20	-0.75
#21	+0.75(doubles)

Trial of yoked prisms produced the following results:

10 prism dioptres yoked base-up: Very distorted and "funny"

10 prism dioptres yoked base-down: Same response

5 prism dioptres yoked base-down was preferred subjectively to yoked base-up for ease of walking and ball catching.

She achieved 80" arc (-1) on the Wirt circles with 5 prism dioptres yoked base-up, and 80" with 5 prism dioptres yoked base-down.

She was prescribed +0.50 sphere, 2 prism dioptres base-down each eye, for wear as much as possible.

On review three weeks later, she reported wearing her spectacles at school and for home reading; both reading and the board were reported as clear. She felt she could "see a lot better, and I feel a lot better." Her teacher reports she is much happier in the classroom. She currently has a severe ear infection which is not resolving, and is also undergoing a course of homeopathic treatment.

Visual analysis was as follows:

Acuities with spectacles:

6m:	6/9+ each eye ("easier" than uncorrected)
40cm:	6/6 each eye
Phorias:	6m: 0
(Howell)	40cm: 2X
Stereo:	50"-1
#14B	+0.75
Control	+0.50 OU
#16	10/6
#17	20/22/20
#20	-0.50
#21	+1.25

Reading was more fluent with her spectacles.

She declined to enter vision therapy since her visual symptoms were relieved.

Over the next 12 months she experienced episodes of intermittent arthralgias, myalgias and headaches. Her distance acuity remained relatively stable at approximately 20/30 right and left. However, her monocular and binocular near acuities varied between 20/20 and 20/160, with amplitudes of accommodation as low as 1 dioptre by push up testing. Her near acuities and accommodative dysfunction tended to vary with the recurrences of post-viral syndrome. She was intermittently provided with reading additions up to +2.00 dioptres, as determined by near retinoscopy, which allowed her to obtain clear reading vision for school tasks.

Twelve months from initial optometric evaluation she was provided with six sessions of vision therapy to develop improved accommodative accuracy, sustenance and facility. Following vision therapy her accommodation had recovered to a level where a reading addition of +1.25 was necessary. More than sixteen months from when she first sought optometric care her post-viral physical symptoms had virtually disappeared.

She has since retained stable acuities of 20/20 each eye at distance and near at regular reassessments over the next two years, and she continues to wear R +0.50 sphere, L +0.50/-0.25x180, without yoked prism.

Case III

N is a 12-year-old female who presented for optometric assessment in relation to headaches of a month's duration. When questioned, she reported the headaches as sharp and persistent, and located mostly frontally and at the apex of her head; she occasionally woke with a headache. She reported wanting to close her eyes frequently, and was always tired. She had not been well for the last month, with non-specific colds and flu, and she reported significant and frequent episodes of depression, confirmed by her mother. She could not train for swimming as usual. Antihistamines had been tried without any relief.

Computerized axial tomography of her head and sinus X-rays was negative.

Ocular health examination was unremarkable, intraocular pressures were RE 10mm Hg, LE 11mm Hg. Analysis was as follows:

Acuities	6m: 6/9 each eye
Phorias	6m: 0
	40cm: 4X
MEM:	R: +0.62, L: +0.25
Stereo	50"-3
Pursuits(NSUCO)	5 5 5 5
NPC	no break
#4	R+0.75, L+0.25
#7	R+1.00, L+0.75
#10	22/9
#11	7/4
#14B	+0.50
#16	X/22/16
#17	22/24/16
#20	-1.00
#21	+1.00

Accommodative facility testing, using MEM retinoscopy to subjectively monitor accommodative response dynamics:

+2.00 initially slow but improves quickly

-2.00 much more difficult, only partial change and clarity

Colour desaturation testing (red cap) suggested a questionable mild desaturation of left eye vision. Colour vision testing indicated non-specific mild difficulties with random errors.

Computerised visual fields (Medmont 164 point screening) indicated approximately 25 degree tubular fields (see Figures 1 and 2).

Careful exploration of N's background and history with her mother revealed no contributory visual, medical or emotional factors.

In view of the combination of headaches, fatigue, depression, accommodative dysfunction, constricted visual fields, and recent health history, and in the presence of normal cranial CAT scan results, she was referred back to her general medical practitioner with a recommendation of further referral to a paediatrician experienced in chronic fatigue syndrome.

Discussion

Chronic fatigue syndrome sufferers commonly report a history of respiratory or gastrointestinal infections, with many experiencing non-specific "flu" before the onset of debilitating fatigue symptoms. The herpes viruses, particularly Epstein-Barr virus (EBV) and cytomegalovirus, are commonly implicated in the prior history. Ross River virus has also been implicated.

Epstein-Barr virus (EBV) is the most common cause of infectious mononucleosis, and has been reported to be associated with oculoglandular syndrome, conjunctivitis, dry eye, impaired accommodation, keratitis, uveitis, choroiditis, retinitis, papillitis and ophthalmoplegia.[6] Other neurological complications, which may have visual manifestations, and which have been attributed to EBV, include encephalitis, meningitis, cerebellar ataxia, transverse myelitis, mononeuritis, and

Guillain-Barre syndrome.[7] Infection results in a lifelong virus carrier status.

Infectious mononucleosis is diagnosed from clinical, haematologic and serologic findings, and is characterised by the clinical triad of fever, sore throat and lymphadenopathy. Some patients with chronic debilitating fatigue, sore throat and lymphadenopathy have been found to have "atypical immunological responses with persistence of serological profiles suggestive of early EBV infection."[6] However, some authorities consider the connection between this syndrome and EBV to be questionable.[8]

A previously unsuspected episode of glandular fever may be suggested by a doctor investigating a patient with chronic fatigue, based on blood tests which reveal antibodies to Epstein-Barr virus. However, some authorities recommend caution in ordering or interpreting the results of numerous blood tests, since it is not uncommon to find at least one abnormal result out of 20 blood tests in a healthy person.

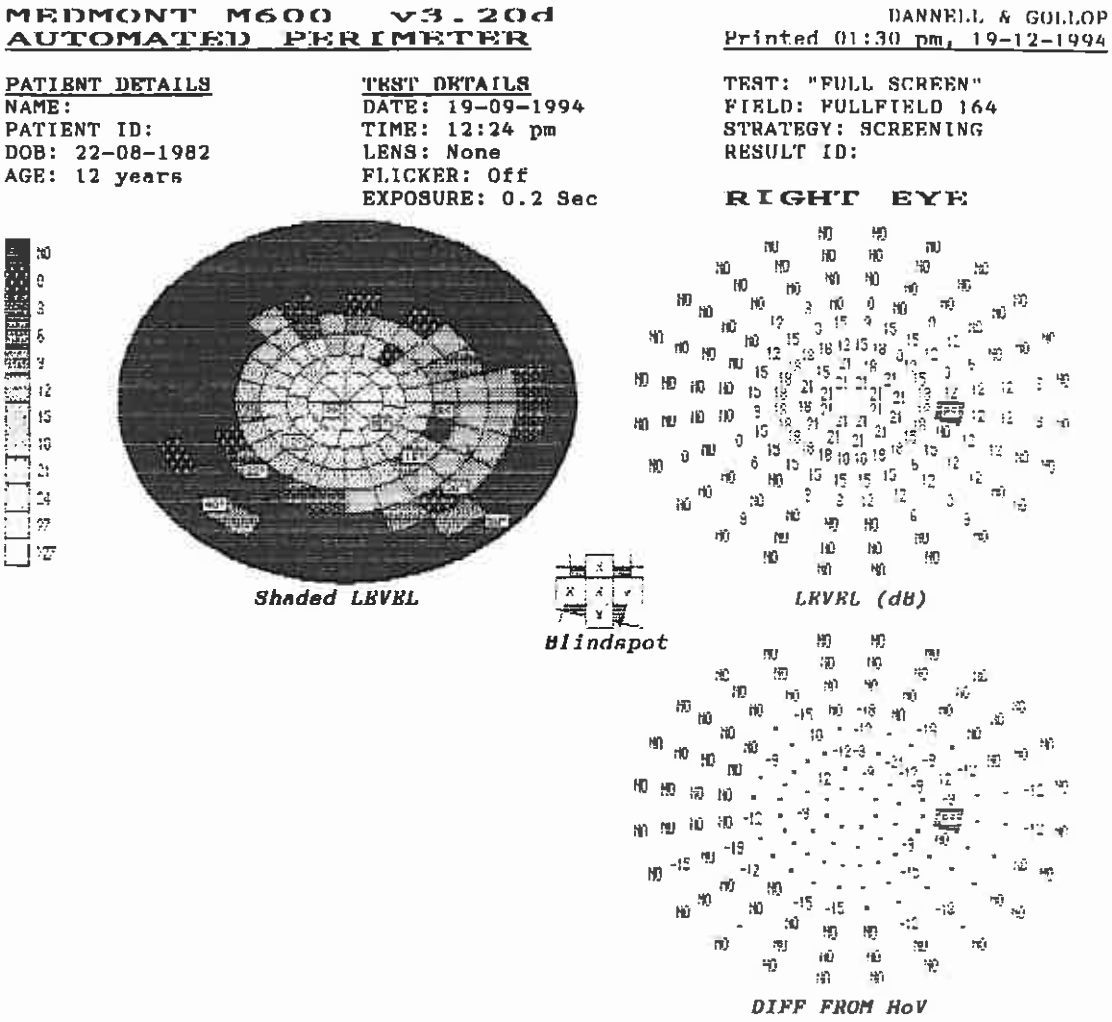

Figure 1. Computerised visual fields for N: right eye

Infectious mononucleosis syndrome may also be produced by cytomegalovirus or *Toxoplasmosis gondii*. Cytomegalovirus (CMV) infection can occur at any age, ranging in severity from a silent, inconsequential infection to serious disease, including fever and hepatitis. Human cytomegaloviruses ("salivary gland viruses") can be present in all body fluids. It can result in severe retinal disease in immuno-compromised patients, for example in patients with AIDS.

CFS has been found historically to affect sportsmen and sportswomen, most probably due to the immune system depression induced by intense training.[9,10]

In Case I the initial presentation of dramatically impaired balance is so inconsistent with traditional neurology and physiology as to suggest malingering or other psychogenic factors. The patient previously had been referred for psychological therapy, and was classified by her rheumatologist and the ophthalmologist to whom she was later referred as malingering. However, the wild variations in the identification system observable by retinoscopy demand strong reservations before a simple diagnosis of malingering, since such accommodation change would be very difficult to consciously or even unconsciously control.

Komaroff reported transient blindness in 4% of his patient study population.[11] The visual disturbance in this case is so severe as to be classified by some as "blind," and it is possible some of Komaroff's cases had similar presentations. Thal et al have reported impaired accommodation in infectious mononucleosis.[12] Caffery at al also found the majority of patients studied had significantly reduced accommodation, in some cases demonstrating a virtual absence of accommodation.[13]

The postural disturbance, accommodative fluctuations, and severely impaired acuities are consistent if we consider com-

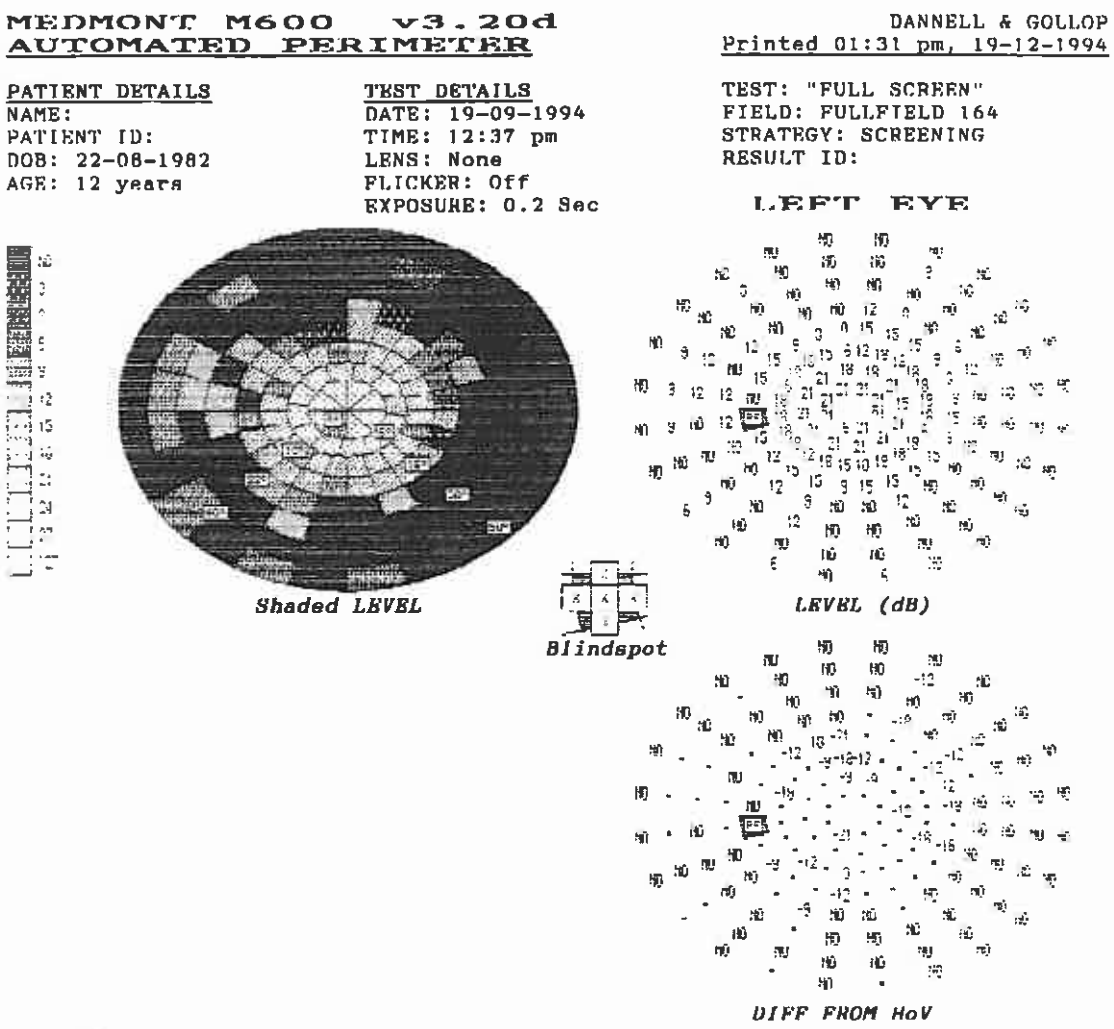

Figure 2. Computerised visual fields for N: left eye

plex effects on the as yet incompletely understood midbrain region, where visual information is integrated with input from the vestibular system as well as touch and joint receptors of the body, producing an intricate interaction of vision and balance. Resolution, which involved a short but violent headache in the same region, may be related or simply coincidental, but suggests a vascular factor which suddenly resolved. Macintyre's suggestion of cerebellar dysfunction and reduced cerebral blood flow (together with recent research reported by Vedelago on increased size of red blood cells) provides possible physical explanations for the rapid resolution.[2,14]

However, current understanding of the relation between vision and posture as well as the neural and chemical effects of CFS make any explanation of a specific causation in this case somewhat conjectural.

Lyme disease can cause significant visual and postural effects in affected patients, and may have exaggerated effects in children. Certainly the patient's history of a recent episode of "flu" while in the United States makes it necessary to at least consider the possibility of Lyme disease in the differential diagnosis.

Lyme disease is caused by the *Borrelia burgdorferi* bacteria following a bite from a tick commonly found on deer in North America, and can be a great imitator of other illnesses, with possible flu-like symptoms, arthritis-mimicking symptoms, and neurological manifestations. It has also been reported in Europe, Africa, Asia and Australia. The first signs of a tick bite may be a bull's eye shaped lesion, although this may have disappeared by the time of presentation. This may be followed by flu-like symptoms, headache, fatigue, arthralgia (painful joints) and myalgia (aching muscles), with conjunctivitis, episcleritis and photophobia. A subsequent dormancy may be followed by neurological and cardiological disease, and Bell's palsy may appear as a common manifestation.

A case of a 4-year-old girl who walked hesitantly, with severely reduced visual acuities was reported by Arnold and Schriever.[15] She had healthy eyes other than reduced pupillary responses, an afferent pupil defect, and bilateral optic nerve swelling which resolved with oral prednisone. Serologic testing for Lyme disease was positive. Others have found optic nerve involvement in Lyme disease may present with acuities ranging from normal to light perception only.[16-18]

In this case there was no ocular pathology visible by optometric or ophthalmological assessment; pupil reactions and optic nerve appearance were normal. Serologic testing for Lyme disease, which has a significant rate of negative results in people who actually have the disease, was not performed.[19]

It is interesting to note virtually normal acuities and accommodative and binocular function two months after the reported return of vision.

Case II demonstrated the more usual clinical visual presentation of CFS. The slightly reduced acuities, loose and fatigable accommodative function, and fatigable vergence function are common as visual manifestations of a general health system under significant stress.

In this case the use of yoked prisms produced a significant improvement in symptoms and visual performance for school work, even though indications for yoked prism use were not strong. However, in cases where the identification system is loose, it is sometimes beneficial to provide a level of increased stability by emphasising the ambient orientation and localisation process, using base-down yoked prism, binasal tapes or small amounts of base-in prism. The resultant increased spatial stability allows the accommodation system to operate more accurately and sustainably.[14,20]

Straussberg et al have reported a case of an 8-year-old boy admitted to hospital with fever, headache, vomiting and photophobia.[21] No ocular signs or symptoms were reported but three weeks following cessation of dexamethasone treatment the patient complained of blurred vision and pain behind both eyes. The only ocular sign was bilateral papillitis with acuities reduced to R 6/60, L 1/30. The optic neuritis was successfully treated with recommencement of dexamethasone. Epstein Barr nuclear antibodies were found to be present six months later.

In Case III, the presenting history of headaches, fatigue, flu and depression, combined with the depressed acuities and accommodative function, strongly suggest the possibility of CFS. Careful history and further investigation is necessary to eliminate other possibilities, particularly optic nerve inflammation or demyelinating disease. The visual fields provide further evidence for a likely diagnosis of CFS, and a negative CAT scan result is reassuring.

The visual fields are remarkable and deserve special consideration. Visual field assessment in CFS commonly produces evidence of variable or patchy fields, with a not uncommon result of tubular or spiral fields which are more traditionally considered indicative of hysteria. The tunnel fields are often inconsistent with observations of normal orientation and mobility, which for some eyecare professionals is supportive of a diagnosis of hysteria or malingering in CFS patients.

However, the requirement for simultaneous attention to a central and peripheral target, especially in a computerised bowl perimeter, in a patient with CFS who has difficulties with simultaneous and sequential mental (and possibly sensory) processing, could produce such apparently psychogenic fields. At the same time, the effort required to physically and mentally attend for a period of time approaching 20 minutes for screening or threshold testing in a bowl perimeter may be extremely fatiguing for a CFS patient, resulting in variable and possibly unreliable field results.

MANAGEMENT

Macintyre suggests ME patients may require reading additions earlier or greater than expected, with prism possibly necessary in cases of convergence insufficiency where vision training is not feasible due to fatigue.[2] She also advises:

- Provision of the best reading prescription
- Use of optimal illumination
- Confine reading to less fatigued periods of the day, and read for short intervals
- Use of tints where hypersensitivity to light is a problem
- Prescribe artificial tears and lubricating drops for associated "dry eye"

She also cautions that patients reporting more serious aching, pain and redness should be assessed for the possibility of anterior or posterior uveitis, which may be related to a viral infection or a non-specific immune response such as rheumatoid arthritis in ankylosing spondylitis; it is important not to automatically assume any new ocular symptoms are simply further manifestations of the ME.

Caffery et al found preocular tear film abnormalities in 19 of 25 patients diagnosed with CFS, with associated "gritty, dry and burning sensations which seemed to wax and wane with the severity of their fatigue level and myalgia."[13] They also found reduced accommodation amplitude in 18 of the 25 patients, and eight subjects had random misses on visual field assessment. All patients assessed reported ocular symptoms. They recommend a reading or bifocal prescription where accommodative function is reduced, and dry eye therapies where symptomatology is accompanied by dry eye signs.

Vedelago has extensively described the symptomatology of CFS as well as the management options, ranging from plus lenses with the possible addition of base-in or yoked prism, to vision therapy and dry eye therapy.[14,20]

CONCLUSION

Patients with chronic fatigue syndrome probably present to optometrists more commonly than is realised. Frequently these patients complain of a range of apparently unconnected and puzzling symptoms. It is important in such patient presentations that optometrists perform a careful history and extensive testing to rule out other more sinister possibilities. In some cases optometric examination may be the initial indicator of a diagnosis of chronic fatigue syndrome in a patient who has suffered vague but debilitating symptoms, and been subjected to numerous inconclusive medical tests as well as medical and acquaintance's suggestions of malingering or attention-seeking. Patients already diagnosed with CFS may present for optometric care with vague ocular symptoms; the range of possible ocular and visual problems possibly associated with CFS consequently demands careful and thorough optometric investigation, as well as thoughtful management to maximise visual comfort and performance.

The prognosis for CFS patients is for a long, slow recovery with variable improvement and relapses. Management of the ocular and visual manifestations can provide significant improvements in quality of life for a person who otherwise has a significantly debilitating and frustrating condition, with no immediately effective treatment available, and which interferes with the ability to perform even the most mundane tasks of everyday life, let alone work or play.

Endnote

A. The antisaccade test involves the examiner standing in front of the patient with a finger of each hand held up at shoulder length apart and at eye level. The patient is first asked to fixate the examiner's nose, and to look immediately at the finger that is "wiggled" by the examiner. Next the patient is asked to look at the finger that does NOT move. The test has been extensively researched by Dr. John Curie, and is believed to assess the patient's ability to consciously direct eye movements rather than reflexly saccade to a moving peripheral object.

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