Prescribing Prism Orthoptically

Please see below the summary of a presentation that I was emailed but unfortunately was unable to attend. Would you like to share a few thoughts regarding this orthoptist’s opinions?

Prescribing Prisms with Confidence

Who would you prescribe prisms to? How would you prescribe?

Elderly patients with decompensating exophoria’s

- Easily managed
- Will complain of very intermittent diplopia
- Usually need a small amount of base in prism and not full correction
- Cover test would show minimal exophoria
- If not improved by prism may require referral

Myopia & esophoria’s

- Asymptomatic- do not require prisms

Giving prisms will

- Reduce their fusional reserves
- They will ‘eat up the prism’
- In turn
  
  = thicker glasses
= reduced fusion
= DIPLOPIA (double vision)
= reduce vision / blur vision
= unhappy patients
  ○ May then need surgery or in cases where the angle is small it can be harder to further manage.

Example
  ○ 73 year old lady
  ○ High myopia
  ○ Large decompensating esophoria
  ○ Advised to have 8^ BO incorporated
  ○ How would you incorporate this?

What to do?
  ○ Cover test & alternate cover test
  ○ Ocular motility
  ○ Are they complaining of diplopia?
  ○ If so could it be a 6^th nerve palsy?
  ○ If querying a 6^th nerve palsy what would you do?
  ○ Symptomatic esophoria’s can sometimes be manged with orthoptic exercises to increase their negative relative vergence

Fixation disparity
  ○ Who & when do you assess fixation disparity?
  ○ What other tests would you do in conjunction?
  ○ Do patients require a phoria to be fully corrected?
What we do in the hospital

- Ocular Motility - to assess for a nerve palsy
- Cover Test - manifest deviation
- Prism cover test - measure deviation
- Prism trial - what prism joins diplopia, give patient Fresnel to try
- Review - ensure stability (2 stable visits)
- Up to date refraction
- Incorporation

Take home message

- Do not prescribe prisms to asymptomatic patient
- Patients with tropia’s that suppress
- Always split prism evenly & if tilted measure
- If unsure refer to hospital so that Fresnel prism trial can be used.

I am very grateful to Mushir for forwarding this presentation, a mutual understanding of the optometrist and orthoptist roles can assist management and referral of patients with binocular vision (BV) problems. This can avoid unnecessary referrals and conversely avoid protracted delays in resolving BV problems, which can have profound effects on education during an important formative period.

A brief History of Orthoptics

Orthoptics is an optometric invention, which emerged at City University in the 1960’s led by Ron Mallet, Ronald Rabbetts et al. The ambition was to offer this service to the hospital eye service to support ophthalmology in the investigation and management of strabismus and other binocular vision anomalies. At the time the hospitals were not able to fund the salaries of optometrists so they created their own speciality of orthoptics.

At the time the understanding of binocular vision was in its infancy and the new test of fixation disparity had identified muscle balance as a source of difficulties. It seemed when these problems were identified, for example convergence insufficiency implying weak media recti, the obvious solution was to strengthen the weak muscle
with eye exercises.

This fitted the ethos of the time in that it was “free” and did not need spectacles. A second option was refractive control using plus or minus lenses appropriately. As a very last resort prism might be considered.

**The Birth of Orthoptics**

This is the point from which orthoptics took over. Refraction was not a major concern as long as the extent of the gross anomaly was measured with cycloplegia to identify the obvious accommodative squints or refractively control smaller deviations. Since then orthoptists have maintained an important interest in the neuro and muscular anatomy and physiology of the visual system and the aetiology and treatment of binocular pathology. Since the Opticians Act and the introduction of free eye tests optometry has always shown due deference to ophthalmology which is part of the reason we got the contract and orthoptists have become a big part of optometrist undergraduate education.

**Fear of Binocular Vision**

This relationship has perpetuated a frank fear of binocular vision in general practice. Sudden onset squints do not present very often in high street practice. Our predicament has been dealing with the physiological problems of binocular deficiency, which we now believe cannot be understood without a consideration of eye dominance. As a result binocular vision is learnt by rote including a legion of orthoptic exercises, none of which seem to work in practice, even if you can remember what they are for. We could diagnose but not treat, which has led to a lot of Mallet units gathering dust in cupboards.

**Ocular Pathology**

More recently we have persuaded ourselves that refraction and by implication binocular refraction is not that important. It is a far finer aspiration to be an optometrist / ophthalmologist and pretend that the direction of travel for the rest of the profession is not towards the swirling waters of the internet.

This is to conveniently forget that the government is not prepared to pay us for our work in ocular pathology and that the reason that 85% of the population comes to see us is for help with their occupational visual requirements.

Selling specs and contact lenses has given us our professional independence.

The government is beginning to take a jaundiced view of an increasing reliance in some sectors on GOS claims and vouchers.

This requires shorter and shorter eye examinations decreasing salaries and the supply of spectacles where too little time has been spent on the refraction. As a
result spectacles often do not solve the problems with which the patient has presented and we risk falling into disrepute.

**Hospital Binocular Vision (Orthoptics)**

When orthoptics separated from optometry determining the size and direction of the anomaly was done with the cover test and a prism bar checking the pre exiting binocular status with tests like the Worth four dot.

Fixation disparity, with its reliance on an understanding of the refraction was not included. So orthoptics started with the premise that it should determine the existence of underlying pathology, measure the direction and extent of the squint, and monitor or refer for surgery. In the grey area of intermittent squint or symptomatic physiological binocular vision problems, the original idea of eye exercise in the absence of pathology was the required treatment. This strategy might continue for years monitoring at regular intervals to make sure nothing nasty emerged and then typically around the age of eight discharging the patients.

**The Problem with Eye Exercises**

From the start eye exercises have been a problem. To this day there is no evidence that they have a long-term effect. One randomised trial showed significant improvements in the near point of convergence and positive fusional convergence. This was measured at 12 weeks after the subjects were given office–based vision therapy/orthoptics. 42% met the criteria for elimination of symptoms, but over half (58%) remained symptomatic (this would not be acceptable to us or the patient, in practice). 31% of the control (placebo) group also had an improvement in symptoms, which does call the protocol into question. Disappointingly there was no long-term follow up other than the 12-week review.

**The Role of the Lateral Recti**

The assumption that the problem lies with weak muscles may be false. It is quite possible that the lateral recti have evolved to have a slightly springy characteristic, which facilitates quick realignment of the eyes to distance. We know this is possible from its extreme manifestation in Duanes Syndrome, which only affects the lateral reacti.

In nature a rapid and accurate binocular realignment in the distance is essential to survival; this is where the danger of attack lies or the food we chase needs to be caught.

A stable platform for distance vision would make binocular vision more reliable. For near tasks a little extra enervation to the media recti would sustain this vision for
limited periods.

If there were a problem with extended close vision tasks, the relative inelasticity of the lateral recti would make prolonged eye exercise quite uncomfortable and explain poor compliance and no lasting effect. Convergence insufficiency may not be due to an inherent weakness in the medial recti.

**Accommodation/Vergence Reflex**

Another problem which is masked by an over reliance on cycloplegic refraction is the effect of the accommodation/vergence reflex. Our own studies show that the most common BV deficit is an accommodation/vergence insufficiency. When there is a difficulty converging, the brain relies on this reflex to control convergence; one weak system supporting another. Giving eye exercises potentially just forces the eyes to accommodate harder and does not exercise the media recti at all (Like giving a man with a broken leg hopping exercises).

**Anatomical Deviations**

Other surprisingly common physiological deficits are related to anatomically outwardly displaced of the orbits, vertical displacements, or simply eyes too far apart (think of PDs greater that 67).

We are beginning to find that one of the most intractable BV problems is divergence excess invariably co existing with convergence insufficiency. The severity of the signs and symptoms begin to mimic (if not cause) Autism and Asperger’s, attention deficit and hyperactivity disorder. It is not beyond the bounds of possibility that if these problems remain unresolved they could lead to severe psychological problems in later life.

**Orthoptists**

The skill level of the orthoptist and their clinical awareness make them a very important part of the hospital eye service including many ancillary roles.

Their difficulty with refraction and physiological binocular deficit could make them feel threatened by optometrists working in the hospital eye service. This may lead to an irrational resistance to skills they do not need and are not required to understand. Dealing with physiological binocular vision deficit is the role of the high street optometrist and dispensing optician and is quite distinct from orthoptics.
The Presentation- Prescribing Prisms with Confidence

With this in mind it becomes easier to understand this presentation (reproduced in black below). The comments (in blue) are not meant as criticism but seek to help to define differences and make it easier for optometrists to support the NHS outside the HES. This in turn will make it easier to prevent children being held up in their education and make sure adults do not suffer visually related work crises.

The presentation wishes to answer these questions:

• Who would you prescribe prisms to?
• How would you prescribe?

Elderly patients with decompensating exophoria’s

• Easily managed

Decompensation is defined by the Mallet test so I am not sure why an orthoptist is using this term or how they measure it. It is generally their policy not to prescribe prism and discourage their optometrists from measuring or prescribing prism (Leicester Royal Infirmary). Managing exophoria at any age takes a lot of experience even after doing the Schoolvision diploma. It is incredibly rewarding but to say it is easily managed suggests it is not being done thoughtfully.

• Will complain of very intermittent diplopia

Intermittent diplopia is the tip of the iceberg optometrically indicating a significant convergence insufficiency. In hospital terms, just like intermittent Eso or Exo tropia in children, this is something to be monitored and of no immediate concern pathologically.

• Usually need a small amount of base in prism and not full correction

The patient needs to be fully corrected and given the measured prism, it may include vertical prism and is unlikely to be the same in both eyes.

• Cover test would show minimal exophoria

Cover test often shows a large exophoria especially where there is an intermittent squint, it can be in excess of 20 D Base IN and can be monocular Base IN.
• If not improved by prism may require referral

If the prism has not been properly measured (fixation disparity) and prescribed the patient may be inappropriately referred.

Myopia & esophoria’s
• Asymptomatic - do not require prisms

Not sure why myopia and esophoria are grouped, in practice myopia is much more commonly associated with exophoria.

Giving prisms will

☐ Reduce their fusional reserves

Prism will reduce the need to try so hard to fuse, this is not the same as saying will reduce fusional reserves.

☐ They will ‘eat up the prism’.

This has never been true (Mallet), it seems this is where the myth has arisen.

I suspect because prism is so rarely prescribed in hospital and then very much under prescribed, that it would appear each time the patient returns they require more prism because they were never given enough in the first place. In reality the hospital position on prism is so sceptical that very few orthoptists would have the courage to investigate this statement. Mallet said in his original work that correcting the fixation disparity does not cause the subject to eat up prism, it stabalises the situation. In fact we are now beginning to see evidence that tone returns to the media recti when they are given an achievable task and accommodation is supported by a reading addition.

In turn will give

☐ Thicker glasses

This is self-evident; it is not a reason not to prescribe. This can be managed with high index materials quite acceptably up to 9 Prism dioptres.

☐ Reduced fusion

Prism improves sensory fusion as shown on the Mallet test.

☐ DIPLOPIA (double vision)

The point of prism is to prevent latent diplopia becoming manifest, this statement
does not make sense.

- Reduce vision / blur vision

One of the advantages of improved binocularity is that binocular vision improves. This effect can even be demonstrated monocularly.

- Unhappy patients

It is difficult to understand where the presenter gets the evidence to make these statements; this is patently not true, the use of prism to correct binocular deficit can be life changing.

- May then need surgery or in cases where the angle is small it can be harder to further manage.

It is worrying that surgery is considered where the use of prisms has not be fully explored or understood.

Example

- 73 year old lady
- High myopia
- Large decompensating esophoria
- Advised to have $\pm 8^\circ$ BO incorporated.
- How would you incorporate this?

Esophoria in high myopia is rare in general practice. I have one patent (-21DS) whom we have managed for years with prism (6B OUT R+L), this could be related to a 6th nerve palsy, in which case it is not strictly a physiological problem. It is possible for post trauma stable patients to be managed in practice to delay the need for surgery; vascular accident or brain injury for example. We would incorporate this by using a high index material. With high powers you do not need much decentration to achieve high prism powers.

What to do?

- Cover test & alternate cover test
Ocular Motility

Are they complaining of diplopia?

If so could it be a 6th nerve palsy?

If querying a 6th nerve palsy what would you do?

Symptomatic esophoria’s can sometimes be managed with orthoptic exercises to increase their negative relative vergence

The case for eye exercises is not strong.

Cover test & alternate cover test

Ocular Motility

Are they complaining of diplopia?

If so could it be a 6th nerve palsy?

If querying a 6th nerve palsy what would you do?

Symptomatic esophoria’s can sometimes be managed with orthoptic exercises to increase their negative relative vergence

I would like to see the published evidence and a description of the exercise.

This is a description of an orthoptic investigation of a suspect sudden onset diplopia, it does not include refraction or the measurement of fixation disparity. It cannot be used to argue against the use of prism.

Fixation disparity

Who & when do you assess fixation disparity?

What other tests would you do in conjunction?

Do patients require a phoria to be fully corrected?

No more information is given here so we do not know if this is a description of what should be done by optometrists. ASvP members are reasonably up to speed on what we should do. It would be nice to know if orthoptists support this. The use of the phrase fixation disparity is encouraging.
What we do in the hospital

- Ocular Motility - to assess for a nerve palsy
- Cover Test - manifest deviation
- Prism cover test - measure deviation
- Prism trial - what prism joins diplopia, give patient Fresnel to try
- Review - ensure stability (2 stable visits)
- Up to date refraction
- Incorporation

Understood, this is an orthoptic investigation

Take home message

- Do not prescribe prisms to an asymptomatic patient

The hospital's priority is to eliminate pathology. The symptoms of a physiological BV deficiency may not be obvious to someone who is looking for pathology and certainly the tests they use will be looking for gross anomalies not the subtleties of physiological deficit.

Many children who present for a Schoolvision assessment, after years of NHS tests where they have been told nothing is wrong with their eyes, with further questions and experience the significant signs and symptoms are all revealed. Too often we hear stories of hospitals saying nothing is wrong right up to intermittent ESO and EXO tropia (too soon to operate). This is despite the parents’ protestations that things are far from normal.

The difficulty for our inter-professional relationships is that the hospital orthoptist may be correct that there is no pathology. What then makes things difficult for the child (or adult) is going on to denigrate another professional’s opinion (the optometrist) by saying (without evidence) you do not need these prisms, throw those glasses away, do not waste your money, or even making a formal complaint against some of our ASvP colleagues.

- Or patients with tropia’s that suppress

This betrays a fundamental misunderstanding of the role of suppression and amblyopia.

Amblyopia is an adaptation to BV deficiency to prevent double vision. If the eyes are
realigned to allow both foveae to fixate on the object, the brain has no option but to switch of the suppression to allow the amblyopia to resolve.

Patching on the other hand may temporally improve visual acuity but as soon as the patch is removed the visual system will revert to the previous adaptation unless the underlying binocular vision issues have been resolved.

During patching the binocular function will be further disrupted and a child being forced to continue their education will be significantly disrupted by having to use their amblyopic eye. They will also be deprived of even the rudimentary (but useful) BV that abnormal retinal correspondence (ARC) was giving them.

Decompensation is possible in long established squint with strong ARC and subjectively, if not measurable on Mallet, comfort can be improved and symptoms resolved by giving some prism to compensate the ARC. This will be nothing like the full angle of the squint.

It is also important to consider the problems of anisometropia and different image sizes. The brain will continue to supress if it cannot merge these images. A contact lens(es) can help to overcome this difficulty in conjunction with spectacles.

**Always split prism evenly & if tilted measure**

Prism should always be given to the eye with the slip as Mr Mallet said amply, supported by or own research. The prism is rarely the same in the right and left eyes. If prism is prescribed inappropriately it can change spatial awareness and be quite disturbing to the subject. I do not know how Orthoptists measure tilt.

The Objective Muscle Balance test will show the row of numbers due to the eye with the vertical deviation tilted one. An attempt should be made first to correct this with horizontal prism using Mallet. Use a vertical prism if the horizontal prism does not correct this.

**If unsure refer to hospital so that Fresnel prism trial can be used.**

Our NHS colleagues in the corporate sector rarely have the time to complete a full BV assessment (prescribing rate for prism in Leicestershire is 1%) and they will be frequently unsure. If they referred every child about whom they were unsure the HES would collapse under the weight, so this advice is a little disingenuous. Trying Fresnel prisms leads us back to where we started the HES with a different set of priorities is unlikely to have the tools to resolve a physiological binocular vision deficit.