THE COLLEGE OF OPTOMETRISTS

Stage Two

Overarching case scenario 1

ETHNIC BACKGROUND Caucasian, male aged 18 years.

OCCUPATION AND HOBBIES 'A' level student wants to study medicine : non-driver: cinema, socialising, reading

PRESENTING SYMPTOMS AND HISTORY Frontal headaches towards late afternoon/early evening over past few weeks, which disappear after sleep. Currently studying for exams which are in 1 months time. Vision good for distance and near. Never worn spectacles. Had twig in eye (can't remember which) aged 6 years - treated by hospital, no long-term effects. Paternal grandmother has cataracts.

GENERAL HEALTH AND MEDICATION good, no medication. Mother has high blood pressure.

PRESENT Rx, CENTRATION AND ACUITIES none

PD/NCD 61/57 at 33cms

VISION RE: 6/5 LE: 6/5

PINHOLE VISION RE: 6/5 LE: 6/5

REFRACTION RE: +0.50/+0.25 x 180; LE: +0.50

VA Distance RE: 6/5 LE: 6/5

Near RE: N5 LE: N5

ACCOMMODATION RE: 12D LE: 12D Binoc 12D

BINOCULAR STATUS without Rx Cover Test

Distance 4 prism esophoria

Near 12 prism esophoria , slow recovery

With Rx

Distance Maddox Rod 2 prism esophoria

Near Maddox Wing 10,1esophoria, slow recovery

Fixation Disparity Near Mallett Unit RE 2 prism base out or binoc +0.50 DS eliminates slip.

MOTILITY full, no diplopia

CONVERGENCE NPC = 8cm

PUPIL REACTIONS direct, consensual and near reflexes present

FUNDUS EXAMINATION see attached

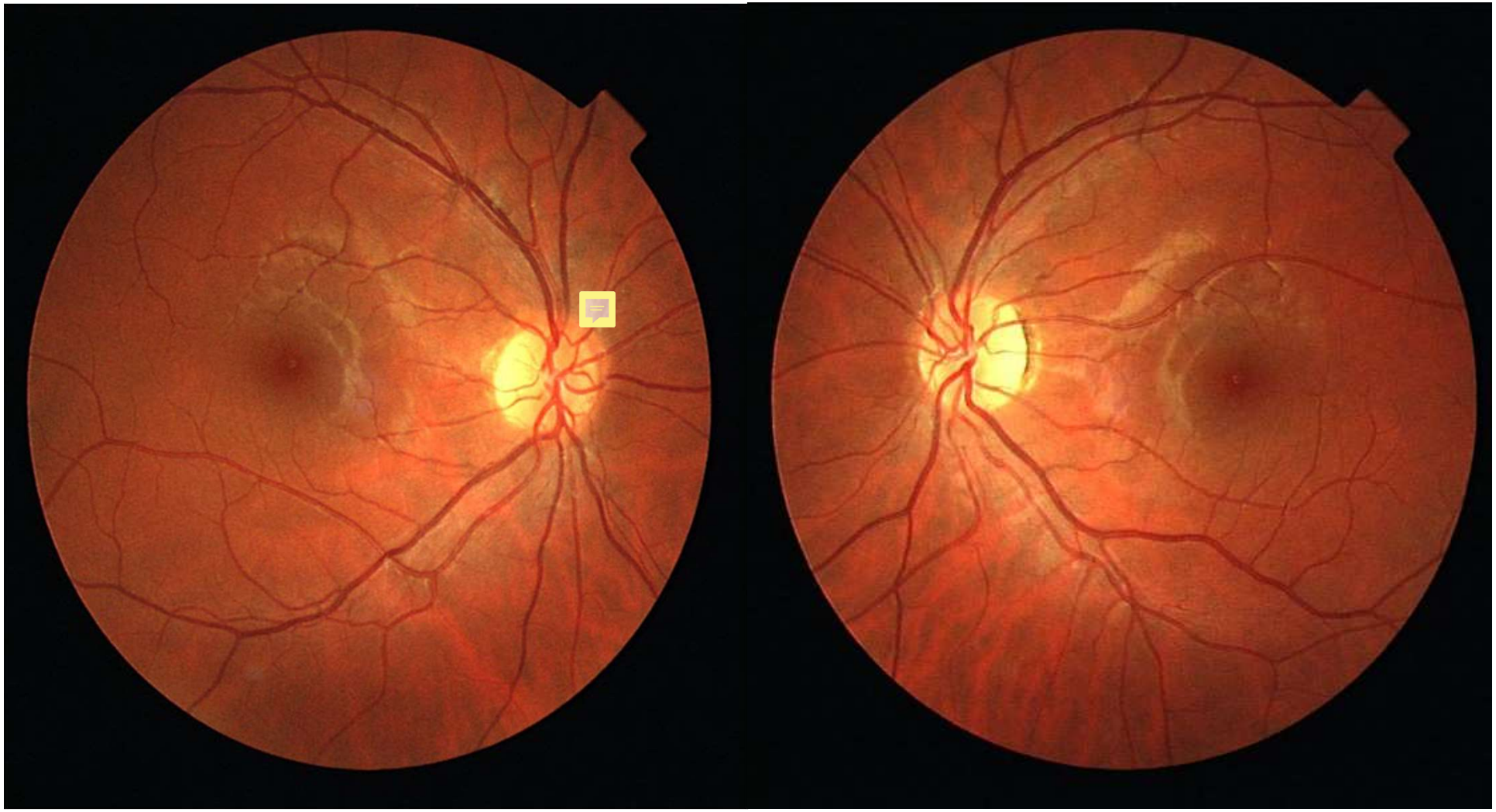
FIELDS see attached

IOP RE: 15 mmHg LE: 14 mmHg AO NCT 9.30am

EXTERNAL EYE EXAMINATION see attached

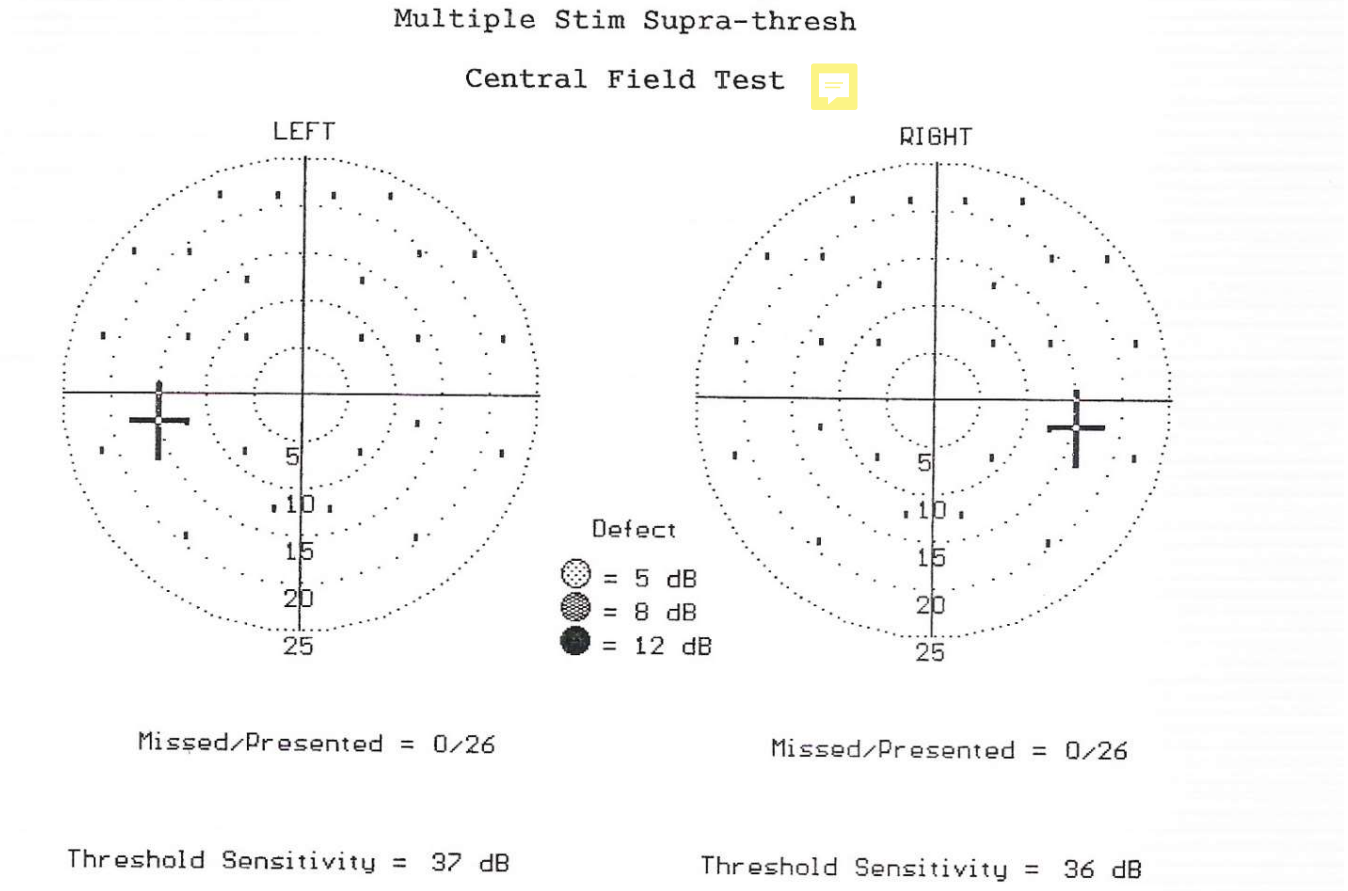
COLOUR VISION see attached

Fundus Image



External Eye LE (RE similar)

Field RE & LE


Multiple Stim Supra-thresh
Central Field Test
LEFT
RIGHT
5
10
15
20
25
Defect
= 5 dB
= 8 dB
= 12 dB
Missed/Presented = 0/26
Missed/Presented = 0/26
Threshold Sensitivity = 37 dB
Threshold Sensitivity = 36 dB

Colour Vision (Binocular)

ISHIHARA TEST SCORE SHEET (38-PLATE EDITION, 1979)

NAME: DATE:

PLATE	SCORE	NORMAL	DEFICIENT	TOTAL CD/ WEAK	PROT ANOPIA	PROT ANOMALY	DEUTER ANOPIA	DEUTER ANOMALY
1	12	12	12	12	12	12	12	12
2	3	8	3	-				
3	8	6	5	-				
4	70	29	70	-				
5	35	57	35	-				
6	2	5	2	-				
7	5	3	5	-				
8	17	15	17	-				
9	21	74	21	-				
10	—	2	-/X					
11	—	6	-/X					
12	—	97	-/X					
13	—	45	-/X					
14	—	5	-/X					
15	—	7	-/X					
16	—	16	-/X					
17	—	73	-/X					
18	—	-	5	-				
19	2	-	2	-				
20	45	-	45	-				
21	7-	-	73	-				
22	6	26			6	(2)6	2	2(6)
23	2	42			2	(4)2	4	4(2)
24	5	35			5	(3)5	3	3(5)
25	6	96			6	(9)6	9	9(6)

NOTES: - no numeral read X incorrectly read A(B) A clearer than B

Case scenario 1

Key points:

- Young student with frontal headaches after hours of studying and close work
- Wish to study medicine
- Good unaided distance and near vision

Consider the following questions:

- **What is the likely cause of headaches?**
- **What is your management, in terms of glasses, BV exercises, prisms?**
- **What other tests would you do and why?**
- **Colour vision test indicates that he has a protan defect. How is this going to affect him studying medicine. How do you explain this to your patient?**

When someone comes in with headaches, our aim is to find out if the headaches are visual related or not. And the most common eye-related headaches are:

- Uncorrected refractive error, e.g. latent hyperope, uncorrected astigmatism
- Binocular vision disorders, e.g. convergence insufficiency, reduced accommodation, decompensated phoria/tropia
- An ocular pathology, e.g. papilloedema

We know the anterior and posterior health is good, ruling out any sinister ocular pathology. Now, we will address any uncorrected refractive error first, followed by any BV issues.

An +0.50 was found on subjective refraction. In most cases, this prescription (rx) is not enough to cause asthenopia, therefore prescribing this will not alleviate the patient's symptoms.

Latent hyperope should be suspected and retinoscopy should be done

Young hyperopes can achieve an unaided vision of 6/6 with up to an uncorrected rx of +3.00D but may have a large phoria. An improvement of the phoria will be observed with the refractive rx in place.

Realistically, most latent hyperopes cannot tolerate the full rx. as they will find the distance vision too blurry. Some can tolerate 2/3 of the full rx, while some only half. The key is to reduce the rx binocularly such that the distance vision is clear and that the near vision is comfortable and significantly improves the esophoria.

e.g. if the patient is a +2.00, reduce RX to +1.00 or +1.25.

Clear distance vision is important because he needs to be able to see the board clearly in class while using the glasses for near work. Advised adaptation. Part-time wear is usually recommended for near concentrating tasks, e.g. studying, screen time.

So, what happens if there is no latent hyperope? Consider convergence insufficiency (CI) or accommodation insufficiency.

It is unlikely to be convergence insufficiency as the Near point convergence (NPC) values are normal for his age. However, the test should be done at least 3 times as some may show a receded NPC upon retesting. Moreover, CI tends to have a large near exophoria rather than an esophoria.

Moving on, amplitude of accommodation.

This is calculated with the formula: 15 - $\frac{Age}{4}$ = 15 - $\frac{18}{4}$ = 10.5D

Since the monocular and binocular accommodation is 12D, his amplitude of accommodation is normal, again unlikely to be the cause of his headaches.

This brings us to the 2 possibilities of his headaches:

1. **Latent hyperope**
2. **Decompensated esophoria**

A decompensated phoria can be attributed to an uncorrected refractive error. Therefore, until the latter is proven otherwise, prism should not be the first choice of correction. Consider cycloplegic refraction if the symptoms and clinical findings do not correlate, or if the retinoscopy reflex is too fluctuating.

Sometimes just by prescribing glasses, the phoria becomes compensated.

In this scenario, we don't know if the patient has latent hyperopia since retinoscopy was not performed. Based on the subjective refraction of +0.50DS, the near esophoria remains large and has a poor recovery. I suspect latent hyperopia is present. However, I should point out that this is done with the measurement of phoria was done with Maddox Wing which is dissociative, and the result can vary from the cover test. For a fair comparison, the cover/uncover test and prism cover test should have been done with the refraction results.

On fixation disparity, the esophoria was eliminated by +0.50D or 2 BO prism.

Assuming that there is no latent hyperope on retinoscopy/cyclo, I would be more inclined to prescribe the 2BO prism to improve the near esophoria. It's good practice to also record the speed and recovery of the phoria with 2BO.

However, if there is significant hyperopia, check for phoria compensation on fixation disparity and cover/uncover test again with the refraction results. Any refractive error should be corrected first before considering prism.

Orthoptic exercises in this scenario will not help. Even if so, is it practical to try orthoptic exercises given this short time while he is studying for his exams?

Colour vision defect

Ideally a colour vision defect should be confirmed with a second colour vision test.

Consider how are you going to explain this to the patient in layman's terms and how will it affect him.

Be empathetic.

In the UK, the General Medical Council (GMC) does not explicitly prohibit people with CVD from pursuing a career in medicine. However, there are some considerations

- He will have to disclose this during his medical admission so that appropriate support can be provided
- Depending on the type of specialty he wishes to pursue, a protan defect can be challenging. E.g. dermatology to identify rash, surgery, pathology
- Interpreting colour coded results
- Medical schools or employers may carry out an occupational health assessment to decide if reasonable adjustments can be made to accommodate the individual's needs

Explaining to the patient:

When we checked your colour vision, you weren't seeing some of the numbers. You have a type of colour vision deficiency called protanopia, which means you have difficulty distinguishing between certain colours, particularly reds. This happens because the cells in your eyes that detect colour (called cones) don't respond to red light as they normally would. It's something you're born with, and it's quite common. Many people with a colour vision defect usually don't know they have it as they have adapted to telling certain colours apart by using brightness.

In everyday life, you might notice challenges with tasks that rely on colour, like telling apart certain shades of red and green, or while cooking meat, judging by their colour and how cooked they are.

If you're thinking about studying medicine, it's important to know that your colour vision deficiency won't stop you from becoming a doctor. Many doctors with similar conditions have successful careers. However, there are some areas of medicine where colour perception is important, such as identifying rashes, reading test results, or performing certain types of surgery.

The good news is that medicine is a vast field with many specialties, and not all of them rely heavily on colour vision. You'll also have access to tools and strategies to help you adapt, like using labels, patterns, or technology to assist with colour-related tasks.

If you're passionate about medicine, don't let this hold you back. Many medical schools and workplaces are supportive and will help you find ways to succeed. It's a good idea to discuss your condition with the medical school or an occupational health advisor early on, so they can provide any adjustments you might need.

Remember, your determination and skills matter far more than your ability to see certain colours. Many people with colour vision deficiencies have gone on to have amazing careers in medicine—and you can too!