

Examination Report

June 2015 Refraction Certificate Examination



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Mr Michael Nelson BSc (Hons) FRCOphth MAEd
Education Adviser

1 Introduction

The Refraction Certificate examination is now offered in Malaysia and was held in Kuching for the 2nd time on 16 June 2015. 33 candidates presented themselves for the examination. The examination consisted of a 12 station OSCE covering a range of skills required to assess visual acuity, refractive error and the prescription of spectacles.

Examination blueprint

The Refraction Certificate (RCert) is designed to assess the following learning outcomes from the Royal College of Ophthalmologists curriculum for ophthalmic specialist training (OST):

CA2	Vision
CA7	Motility
PM1	Management plan
PM14	Spectacles
PS2	Refraction
PS21	Hand hygiene
C1	Rapport
C2	Communication
C12	Records
BCS6	Optics
BCS14	Instrument technology
AER16	Time management

Examination Structure

The examination consists of 12 OSCE stations. Each station contributes a possible 15 marks to the overall total. The stations for the examination were:

1. Cycloplegic Retinoscopy (CR1)
2. Cycloplegic Retinoscopy (CR2)
3. Subjective Refraction Cylinder (SRC)
4. Cycloplegic Retinoscopy (CR3)
5. Cycloplegic Retinoscopy (CR4)
6. Lens Neutralisation (LN)
7. Non Cycloplegic Retinoscopy (NCR1)
8. Non Cycloplegic Retinoscopy (NCR2)
9. Visual acuity and IPD measurement (VA)
10. Subjective Refraction Sphere (SRS)
11. Binocular balance (BB)
12. Near Addition (NA)

2 Summary and recommendations

This is the 2nd report on the Malaysian sitting of the Refraction Certificate examination. The entry criteria, standard setting and stations are the same as the examination sat in the UK.

In line with the UK examination, the pass mark was identified using the Hofstee method. The pass mark in Malaysia was slightly higher (69%) than the July UK examination (66%) and but the pass rate was the same 58%.

The reliability was reasonable at 0.73 but falls short of the recommended value.

Male candidates were more successful than female candidates (70% vs. 46%)

3 Standard setting

Candidates must be able to accurately assess visual acuity, measure refractive error and recommend an appropriate spectacle correction to pass the RCert. The pass mark was identified using the Hofstee method:

Hofstee method

In advance of the examination, members of the College's Examinations Committee were asked to nominate the values for the following:

1. The maximum credible pass mark for the examination 80%
2. The maximum credible pass rate for the examination 75%
3. The minimum credible pass mark for the examination 50%
4. The minimum credible pass rate for the examination 30%

The cumulative fail rate as a function of the pass mark and the co-ordinates derived from the four values above were plotted on a graph. The point where a line joining the two co-ordinates intersects the cumulative function curve is used to identify the pass mark. The Hofstee pass mark used to compare the difficulty of successive examinations.

4. Results (table 1)

Number of candidates	33	
Maximum possible mark	180	
Mean candidate mark	124	69%
Median candidate mark	126	70%
Standard deviation	21.1	11.7%
Highest candidate mark	157	87%
Lowest candidate mark	61	34%
Reliability	0.73	
Standard error of measurement (SEM)	10.4	5.6%
Pass mark (Hofstee)	124/180	69%
Pass rate	19/33	58%

Distribution of marks (table 2)

Score	Distribution	Total
61-70	/	1
71-80		0
81-90	//	2
91-100		0
101-110	///	3
111-120	////	4
121-130	//// /	9
131-140	///// //	8
141-150	////	4
151-160	//	2
Total		33

/ Candidate failed / candidate passed

Statistics for each station (table 3)

		Mean	Median	Standard deviation	Minimum	Maximum
1	CR1	12.9	14	3.1	3	15
2	CR2	13.1	15	2.8	6	15
3	SRC	9.2	9	3.5	1	14
4	CR3	12.6	14	2.7	8	15
5	CR4	13.9	15	2.3	6	15
6	LN	10.5	11	3.3	4	15
7	NCR1	7.5	6	4.6	0	15
8	NCR2	6.9	6	4.9	0	15
9	VA	8.8	9	2.5	3	13
10	SRS	9.8	11	3.4	0	13
11	BB	8.3	9	3.2	0	13
12	NA	10.7	10	2.9	4	15

Correlation between stations (table 4)

	CR1	CR2	SRC	CR3	CR4	LN	NCR1	NCR2	VA	SRS	BB	NA
CR1												
CR2	0.57											
SRC	-0.04	0.02										
CR3	0.56	0.45	-0.10									
CR4	0.24	-0.02	0.35	0.09								
LN	0.26	0.00	0.02	0.11	0.30							
NCR1	0.01	-0.04	0.32	-0.35	0.22	0.55						
NCR2	-0.06	0.14	-0.13	-0.13	0.19	0.25	0.49					
VA	0.04	0.37	0.34	-0.16	0.20	0.16	0.27	0.21				
SRS	0.12	0.29	0.48	-0.10	0.25	0.43	0.21	0.14	0.51			
BB	0.10	0.36	0.42	-0.16	0.14	0.23	0.35	0.24	0.33	0.77		
NA	-0.10	0.06	0.22	-0.21	0.37	0.23	0.06	0.26	0.32	0.48	0.52	

Median correlation between the cycloplegic refraction stations = 0.35

Correlation between non-cycloplegic refraction stations = 0.49

Best correlation between BB and SRS (0.77)

Poorest correlation between CR3 and NCR1 (-0.35)

Correlation between each station and the total score (table 5)

CR1	CR2	SRC	CR3	CR4	LN	NCR1	NCR2	VA	SRS	BB	NA
0.39	0.48	0.47	0.09	0.51	0.50	0.52	0.52	0.57	0.74	0.72	0.52

5. Breakdown of results

Breakdown of results by gender (table 6)

	Failed	Passed	Total
Female	7	6 (46%)	13
Male	6	14 (70%)	20
Total*	13	20 (61%)	33

These differences are statistically significant (p = 0.05)

Breakdown of results by first language (table 7)

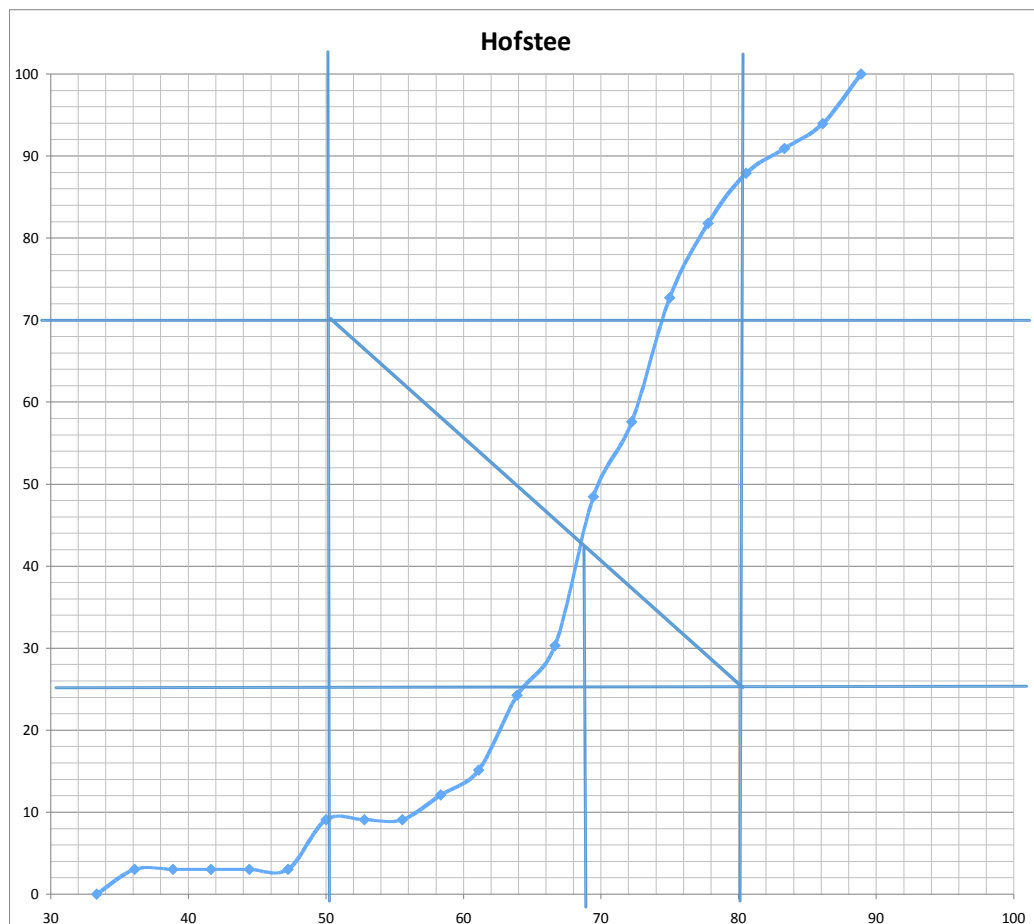
	Failed	Passed	Total
English	6	11	17
Not English	2	1	3
Total*	8	12	20

*Unknown for 13 candidates

Breakdown of results by number of previous attempts (table 8)

Attempts	Failed	Passed	Total
1 (First)	10	17	27
2	2	3	5
3	1	0	1
Any resit	3	3	6
Total	13	20	33

Appendix 1 Hofstee calculation



1. The maximum credible pass mark for the examination 80%
2. The maximum credible pass rate for the examination 75%
3. The minimum credible pass mark for the examination 50%
4. The minimum credible pass rate for the examination 30%

Appendix 2

Candidate Feedback

OSCE stations

Were you treated in a courteous manner by the examiners in this examination?

Yes 11/11

No

Comments

- For my non-cycloplegic examination station, the examiner was courteous, but was not helpful. As it was my very first station, in the midst of familiarizing myself, I erroneously wrote both the answers for the right and left eye into the right eye answer sheet. Although my examiner was present and observing me throughout, they did not bother to prompt me that I should have written my answers on the correct sheet. I only realized my mistake just as the bell rang (signifying the end of the station), and this examiner did not allow me to transcribe my results onto the correct answer sheet.

Were the patients you were asked to examine appropriate for the examination?

Yes 8/11

No 3/11

Comments

- For the non-cycloplegic retinoscopy station, we were tasked to perform refraction on a patient whose eyes were both miosed (pupil size looked about 2-3mm) despite maximal room darkness. In addition, this same patient was elderly and likely to have cataracts judging from the irregular light reflex obtained during retinoscopy. She was also a high myope and had a very dim light reflex. All these factors combined made it a highly challenging case for the retinoscopy to be performed. This patient is not an appropriate candidate for the examination setting, as it is not a good judge of the ability of the examinees to perform non-cycloplegic retinoscopy.
- Exam day: 17 June 2015 The patient selected for station 7 and 8 (Non-Cyclo Refraction) was too difficult to refract as she is a 61 years old lady with cataractous lens, hence poor reflex and extremely miosed pupils.
- The patient chosen for the non-cycloplegic refraction station was very inappropriate. She was a high myope with extremely small pupils which made it very difficult to visualize any pupil reflex, let alone the direction of the retinoscopy streak! Patients with such miosed pupils should not be recruited for exams as this makes it an unfair assessment of a candidate's ability to refract the subject.
- The patient chosen for 'the Binocular balancing' Station did not have a similar Best-corrected visual acuity in both eyes – which makes binocular balancing challenging and misleading.

- The other patients were reasonable.
- Patient at the non-cycloplegic retinoscopy station was a very high myope with small pupils. Not easy in an examination setting.

The OSCE overall

Was the OSCE well organised?

Yes 8/11

No 3/11

Comments

- There is no standardization of the bell for the mark that signifies where candidates only have 1 minute left to complete the station. Instead, the way this was done was that we were informed by one of the administrators who went around knocking the door of each room at the mark where there is 1 minute left. In some cases, the knock was not very audible, and candidates who did not hear the knock were disadvantaged as they did not realize their time was running out. In other times, the time when the knock was given was inaccurate, as the final bell rang less than 1 minute from when the knock was heard. This made it very misleading for candidates, in terms of knowing how much time we had left in the station.
- The rooms are not well-equipped. There is no remote-controlled Snellen chart, and time is wasted by the examinees having to run to and fro from the manual Snellen chart to the patient. Furthermore, we were not allowed for some of the rooms to dim the room lights completely (for retinoscopy), or to turn up the lights maximally (to check visual acuity), which made the examination conditions less ideal.
- The start and end time for the OSCE was not clear to the candidates. Suggest to sound a loud bell to indicate the start and end time, rather than having the examiners walk out of the room to clarify the times and return to the room to inform the candidates, resulting in a time lag.
- The lighting for the rooms were shared for some stations which meant that the lighting could not be adjusted appropriately for each candidate (e.g. The non-cycloplegic refraction could had to be performed in quite a bright setting).
- One of the examiners (for station with non-cycloplegic refraction and trial frame fitting/visual acuity and back vertex distance checking) was poorly prepared for the examination. She was not aware of what she and the candidates were supposed to do. This examiner took a lot of time for unnecessary actions and as such I was not able to maximize the 5 minutes given for each station to complete the allocated tasks.
- For instance, she was not aware that she was supposed to give me the spectacles prescription to load the lenses on the trial frame. I had to ask her for the prescription, and she spent quite some time searching for it. She also falsely advised that we were required to measure the IPD and fit the trial frame accordingly for the non cycloplegic retinoscopy patient, whereas it was clearly stated in the instructions booklet that this was to be done by the examiner prior to the candidate starting

retinoscopy. She also declined to dim the lights prior to the examination time starting and spent time walking to and fro to the switch, before I could actually begin my tasks. Each of these actions cost me time which added up and I was unable to complete the stations in time.

- Also, the knock on the door indicating one minute of time left was soft. The other examiners had kindly informed me that I had one minute left after they heard the knock. However, this examiner did not do so and I was not aware that I only had one minute remaining.
- However, this was in stark contrast to the other three examiners who were extremely helpful and clear in providing instructions, equipment or material, and who knew exactly what I was supposed to do.

Were you given clear instructions about the OSCE?

Yes 6/11

No 3/11

Fairly Clear 1/11

Yes and No 1/11

Comments

- The instructions given were slightly ambiguous. For example, I was not sure what was allowed prior to the timer i.e. some examiners allowed us to place lenses in trial frames, whilst in other stations it was not allowed.
- Also, I realize establishing rapport with the patient is an important criteria but again I was not sure if we were allowed to introduce ourselves prior to the buzzer or after. Furthermore, I felt establishing rapport and performing necessary task particularly in the subjective refraction stations (refining cylinder, sphere and binocular balance) in 5 mins, is not adequate.
- As mentioned above, I was not clearly instructed by my examiner for my very first station as to where to write my answers. I erroneously wrote both the answers for the right and left eye into the right eye answer sheet. Although my examiner was present and observing me throughout, she did not bother to prompt me that I should have written my answers on the correct sheet. I only realized my mistake just as the bell rang (signifying the end of the station), and this examiner did not allow me to transcribe my results onto the correct answer sheet.
- The examiners for the stations for cycloplegic refraction gave clear instructions. However, the examiners for the other stations did not give much instruction (as I believe they probably expected the question sheets to be self-explanatory).
- In future examinations, pls standardize and allow candidates to mount lenses into the trial frames if possible, as also mentioned in the current information sheet given to us.
- Yes for most stations, but the instructions given by the same abovementioned examiner were either not given, or poorly given.

- I feel that the model of the focimeter and the target mires should be explained to the candidate. Not every centre has the same focimeter and it will disadvantage those who are not familiar with the model
- There was a slight change in format to the "back vertex distance measurement" station. I believe this is the first time candidates were told to fit a prescription that was provided before measuring the back vertex distance. All candidates I spoke to were not aware of this format. We were under the impression that we could simply fit a low powered arbitrary lens and proceed to measure back vertex distance.
- There were important differences in the lensmeter used for the exam compared to the set we trained on in our institution. The assessor refused to divulge which were the sphere lines and which were the cylinder lines. This confusion lead to some time being lost.

Did you feel that the OSCE was a fair assessment of your knowledge?

Yes 5

No 5

Unable to comment 1

Comments

- See above comments for the non-cycloplegic station. We were given a patient (miosed pupil, cataractous, high myope) where it was very challenging to perform retinoscopy even for someone who may be well versed in retinoscopy. In addition, though I was able to complete the retinoscopic examination for that station, I wrote my answers in the wrong sheet of paper, and was not prompted by the examiner that I should have been writing it in the correct sheet.
- The OSCE is quite rigid in terms of the time allocation for each task. For several of the 15-min stations, I had finished some tasks ahead of time, but was not able to move on to the next task until much later when the 5 minute mark had passed. It would be better to allow the candidate more flexibility in managing their time in each of the 15 minute stations.
- Overall, it was a fair assessment except for my comments on the patient selected for Non- Cyclo Refraction as mentioned above.
- The patient chosen for the non-cyclo refraction station was very unsuitable due to her small pupils (please see above comments).
- The focimeter station is not a good assessment of our knowledge as the model of focimeters vary in different countries. No matter how much we have practiced locally, when faced with a new instrument (where we are unable to know which target lines indicate the sphere or cylinder), it is very difficult for us to identify the power of the lens. 5 minutes is very short. We are unable to figure out how to use the focimeter unless the examiner can guide us and explain how the focimeter works. This station should definitely be reviewed. More time should be given with adequate explanation from the examiner (or in the exam information pack) on the model of the focimeter and what the lines on the target refer to.
- Otherwise, the other stations provided a fair assessment.

- The OSCE on the whole was a fair assessment of skill and knowledge. However, if one examiner was inadequately prepared and caused much wastage of candidates' time, the candidate is unable to perform up to his/her maximal ability.
- The timing for each station can be extended slightly to say 6-7 mins though to allow candidates to demonstrate their skill under less time pressure. It is more realistic this way as that is the way clinical practice is. We go faster for easier patients and slow down at difficult patients.
- As many have commented prior to this; 5 minutes might not necessarily be an accurate reflection of a candidate's refraction abilities.

Exam Preparation

Who helped you to develop competence in refraction? (Please tick the answer as appropriate)

- | | | |
|--------------------------|----------------------------|------|
| <input type="checkbox"/> | Optometrist | 9/10 |
| <input type="checkbox"/> | Consultant ophthalmologist | 1/10 |
| <input type="checkbox"/> | Fellow trainee | 6/10 |
| <input type="checkbox"/> | Self-taught | 2/10 |
| <input type="checkbox"/> | Other (please list) _____ | |

Question 2

Approximately how many complete refractions (retinoscopy + subjective modification) did you carry out in your preparation for the examination?

- 20 cases
- At least 100
- 80
- 50
- 80
- 50
- 80
- 10-20
- More than 100
- For this exam – 30. For our local refraction certificate – 50 (3 years ago)

Question 3

Please provide any other advice that you would like to share with future candidates.

- Practice at least more than 50 cases before the exam; be aware about time in the exam.
- I would share with them that the examination conditions in the examination centre in Kuching are not very conducive.
- Bring own instruments; be familiar with the answer sheet and OSCE stations.

- Candidates would need to practice as much as they can to develop the speed and accuracy for the examinations.
- Masterpass book of refraction, practice.
- Learn the specific model of focimeter. Be familiar with cycloretinoscopy. Download the exam script and read instructions carefully
- Always practice according to the arrangements of the exam stations. That will help you remain calm in that 5 minutes though it is easier said than done.
- Familiarize yourselves with different lensmeters. (difficult as not many institutions in our country still have manual lensmeters)

Please write any other comments you have about the Refraction Certificate Exam below.

- I hope to add DUBAI as a centre for the exam as soon as possible so as to serve doctors in Africa & Middle East area.
- I hope that the way the examination was conducted, as well as the choice of examiners and patients can be improved.
- The examiner for the Non-cyclorefraction & Trial Frame Fitting station (Kuching) was not familiar with the requirements and instructions for the station, resulting in confusion to candidates and time loss.
- Please ensure candidates are allocated enough time for each station as described in the instructions.
- In one of the stations (room2), the patient was unwell and was coughing and took a break to drink water and relieve his cough. I hope the college takes into consideration the disruption and time lapsed due to the above and assists with adequate grading for the aforementioned station that I took.
- Feedback had been provided to the chief examiner immediately after completing the exam regarding my difficulties with the stations under that examiner.
- Well organized.