

Teaching ophthalmology: mastering the slit lamp examination

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Abstract

Aims Slit lamp examination forms the cornerstone of all ophthalmic consultations but remains a complex skill to master. With the demand on ophthalmologists rising year on year due to an ageing population, a highly trained multidisciplinary team is required to help relieve pressure on the eye clinic. Hence, we decided to evaluate the efficacy of a camera-based slit lamp to teach slit lamp biomicroscopy to a range of healthcare professionals.

Methods Ten volunteers from the eye clinic were recruited onto our training programme (four ophthalmic technicians, an orthoptist, an ophthalmic nurse, a charge nurse, an assistant practitioner, a trainee assistant practitioner and a specialty training 1 [ST1] trainee). Participants were given 30 minutes of structured teaching, including on how to perform anterior and posterior segment examination using the slit lamp and how to use a 90D lens with the camera. Participants completed questionnaires to compare their level of experience, confidence and familiarity with the operations of a slit lamp before and after the programme and results were compared.

Results After training, participants showed improvements in experience, confidence and familiarity in use of the slit lamp. They were also able to label anatomical landmarks of images captured by the slit lamp more accurately following training. Our study demonstrated that the innovative new technology used by the camera-based slit lamp simplified the complex skill of mastering slit lamp examinations.

Conclusions Use of a camera-based slit lamp may be of great benefit, not only to ophthalmologists, but also to allied health professionals. Since a highly trained multi-disciplinary team is crucial to help relieve pressure on the eye clinic, we hope that our teaching programme will help to encourage other allied health professionals to master slit lamp examinations.

Introduction

Despite being introduced over half a century ago, slit lamp examination continues to form the cornerstone of all ophthalmic examinations.¹ The slit lamp biomicroscope illuminates the eye providing a magnified image of ocular structures, making it important for the detection of diabetic and hypertensive complications, such as retinopathy and diabetic macular oedema.² However, being able to conduct slit lamp examinations remains a complex skill to acquire.³ It has been said that “you can’t treat a problem if you can’t identify it”; thus, teaching people to perform slit lamp biomicroscopy remains vital to allowing health professionals to treat patients to the best of their ability.⁴

Ophthalmology consultations account for 10% of all outpatient appointments, the highest of any specialty.⁵ An increasing demand is being placed upon ophthalmologists year on year due to an ageing population.⁶ With demand on eye services suspected to rise by 40% over the next 20 years, it is necessary to have a highly trained multidisciplinary team to help relieve pressure on the eye clinic.⁷ A new curriculum has been published by the Royal College of Ophthalmologists to encourage the training of a highly skilled ophthalmic team to certify the best care for our patients.⁷ Nurses are required to perform post-operative cataract examinations and routinely perform the majority of intra-vitreous injections in many eye units across the country. Optometrists are qualified to use slit lamps to examine patients with glaucoma and age-related macular degeneration, and provide them with healthcare advice and glasses.⁸ Therefore, as healthcare providers continue to take on more roles and responsibilities in the eye department, it justifies the need to train allied health professionals how to use a slit lamp, which is an essential tool in the eye clinic.

The eye clinic in the Great Western Hospital, Swindon (UK), was recently allocated funding from Health Education England (HEE) to purchase a camera-based slit lamp teaching unit.⁹ It allows multiple people to view through the slit lamp simultaneously by projecting the microscope image onto a large screen. We decided to evaluate the utility and efficacy of this system as a novel teaching tool. Our aim was to enhance training methods currently implemented to teach slit lamp biomicroscopy and encourage other allied health professionals to master slit lamp examination.

Methods

Ten volunteers were recruited from the eye clinic into our training programme. Participants included four ophthalmic technicians, an orthoptist, an ophthalmic nurse, a charge nurse, an assistant practitioner, a trainee assistant practitioner and a specialty training 1 (ST1) trainee. All participants were inexperienced in the use of a slit lamp. Ethical approval was not required for this study; consent for participation was provided by the study participants.

Firstly, participants completed a slit lamp teaching questionnaire (see **Appendix 1**). This consisted of four questions to subjectively measure their level of experience, confidence and familiarity with the operations of a slit lamp, in addition to their basic understanding of eye anatomy. A Likert scale was used to rank the questions, ranging from 1 to 5, where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. Participants were then asked to label captured images from the slit lamp to objectively test their ability to recognise anatomical landmarks. The questionnaire was internally validated by two consultant ophthalmologists.

My supervisor and I then trained the participants for 30 minutes using a wide range of videos and photos taken with the slit lamp teaching

camera (Mediworks S390L; Mediworks, Shanghai, China) and stored in a library on the Great Western Hospital database. Training covered how to perform anterior and posterior segment examination and how to use a 90D lens with the camera. Participants then practiced on each other (Figure 1) and support was provided if they found the process challenging. Having completed the structured teaching programme, participants then completed a post-test questionnaire that was identical to the one they had completed before teaching, and the scores were compared with baseline scores.

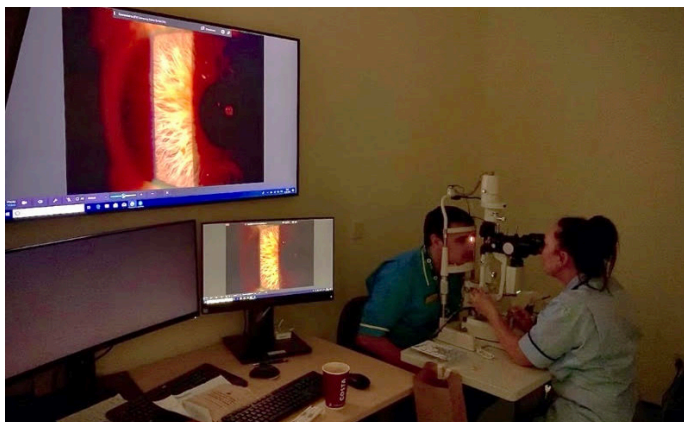


Figure 1. Participants practicing using the camera-based slit lamp on each other. The slit lamp camera is shown to project a large image onto the screen; this image can also be simultaneously viewed down the microscope.

Results

After training, improvements were seen in all four areas for some participants. The increase in knowledge of the operations and functions of the slit lamp was greatest for both the ophthalmic nurse and the ST1 trainee, who both answered the question 'I have a good knowledge of the operations and functions of the slit lamp' with 'strongly disagree' (1) before training and 'agree' (4) after training (see Figure 2). The increase in experience using the slit lamp was greatest for both the assistant practitioner and the ST1 trainee, with the assistant practitioner answering the question 'I have extensive experience in performing slit lamp examination' with 'disagree' (2) before training and 'strongly agree' (5) after training, and the ST1 trainee answering with 'strongly disagree' (1) before training and 'agree' (4) after training. The increase in confidence using the slit lamp was greatest for the orthoptist who answered the question 'I feel confident at using the slit lamp' with 'strongly disagree' (1) before training and 'agree' (4) after training. The increase in knowledge of basic eye anatomy was greatest for the ophthalmic nurse who answered the question 'I have a good knowledge of basic eye anatomy' with 'strongly disagree' (1) before training and 'strongly agree' (5) after training.

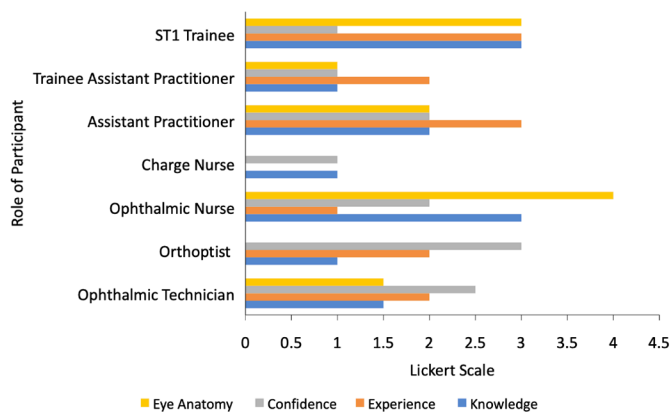


Figure 2. Increase in scores across all questionnaire categories after participation in the teaching programme vs baseline, sorted by participants' role.

In the questionnaire, participants also labelled anatomical landmarks of images captured by the slit lamp. The number of correct labels increased for all participants across all groups after teaching (Figure 3). The ST1 trainee had the greatest change in the number of correctly identified labels, with an increase from three correct labels before training to eight after training.

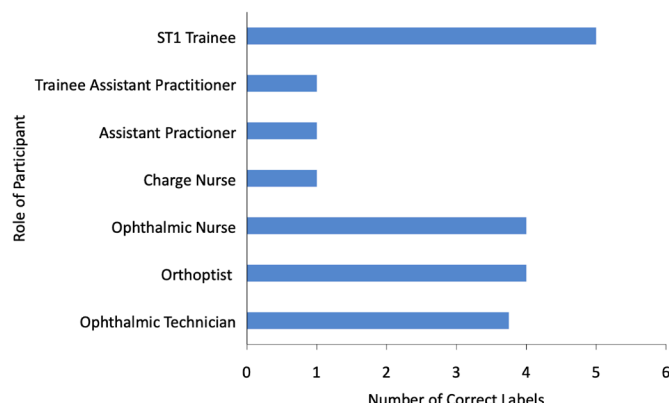


Figure 3. Increase in correctly identified anatomical landmarks of images captured by the slit lamp after participation in the teaching programme vs baseline, sorted by participants' role.

Discussion

Our study suggests that the innovative new technology used by the camera-based slit lamp has simplified the complex skill of mastering slit lamp examinations, potentially making it of great benefit, not only to ophthalmologists, but also to allied health professionals. Nurses, technicians, optometrists and other staff in the eye clinic all saw improvements in all aspects relating to their knowledge of anatomical landmarks and confidence in using a slit lamp. This justifies the need to implement similar training programmes to enhance the efficiency of learning such an essential tool in the eye department for both ophthalmologists and the ophthalmic team alike.

Feedback about the educational material used in this study was thoroughly positive. Nurses who had worked in the health sector for 20 years stated that they "[couldn't] believe that they had managed to perform a basic slit lamp examination", when previously they had presumed this to be an unachievable goal. Despite many years in the profession, many had never had the opportunity to look through a slit lamp microscope and claimed to feel more invested in patients' care due to having a deeper understanding of the clinical aspects. We intend to repeat this study to collate more data and plan to act on the participants' feedback to improve our training programme.

The main limitation of this study was how outcomes were measured. Basing results upon subjective judgements may lead to erroneous conclusions about the programme's effectiveness due to a lack of insight into the participants' abilities and the impact of the programme on their performance.

Conclusions This study, which investigated the slit lamp camera as a useful teaching tool for a range of health professionals, is the first of its kind and we hope its use will continue to be incorporated into teaching in eye clinics at the Great Western Hospital in Swindon. In addition, it is hoped that other hospitals may also introduce programmes to teach health professionals how to use a slit lamp camera to allow better teaching among trainees, as these individuals particularly seemed to benefit from the experience. The greatest increase in the outcomes we measured occurred in confidence, which suggests that a lack of confidence, rather than a lack of knowledge, prohibits clinicians from mastering the use of a slit lamp.

In the future, we hope this may aid in quicker diagnoses of eye clinic patients and better outcomes. It would also be valuable to see the use of such a training programme outside of the eye clinic to teach other clinicians who would benefit from having such a skill, such as accident and emergency doctors, which would help to relieve the pressure on the eye clinic.

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Appendix 1: Questionnaire to subjectively measure level of experience, confidence and familiarity with the operations of a slit lamp, in addition to basic understanding of eye anatomy

The questionnaire was completed by all participants before and after the teaching programme.

The Likert scale was used to rank the questions, ranging from 1 to 5, where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree.

Slit Lamp Teaching Questionnaire

What is your job title:

For the following statements please circle the most appropriate response:

I have a good knowledge of the operations and functions of the slit lamp

Strongly Disagree Neutral Agree Strongly Agree

I have extensive experience in performing slit-lamp examination

Strongly Disagree Neutral Agree Strongly Agree

I feel confident at using the slit-lamp

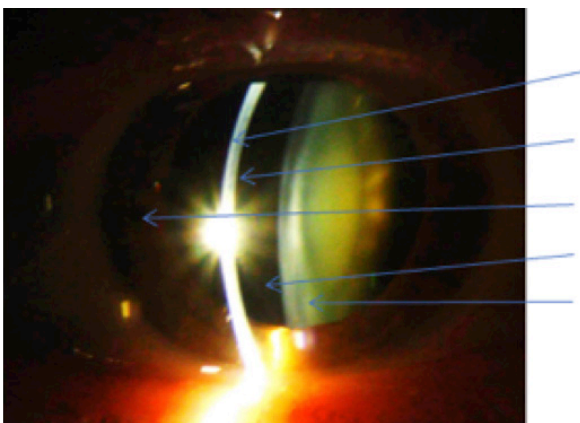
Strongly Disagree Neutral Agree Strongly Agree

I have good knowledge of basic eye-anatomy

Strongly Disagree Neutral Agree Strongly Agree

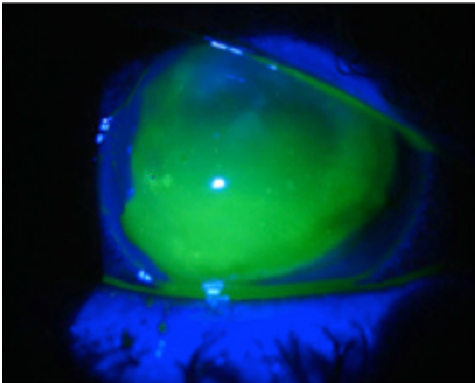
Label the following structures

Answer:



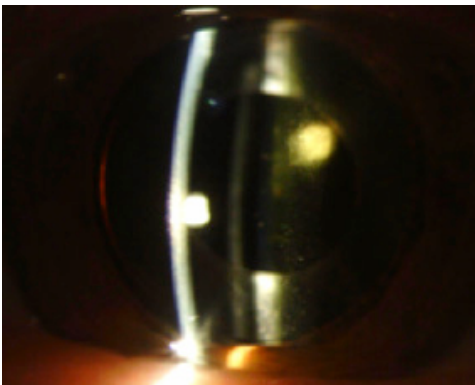
What dye is being used in this picture and what are of the cornea is being stained?

Answer:



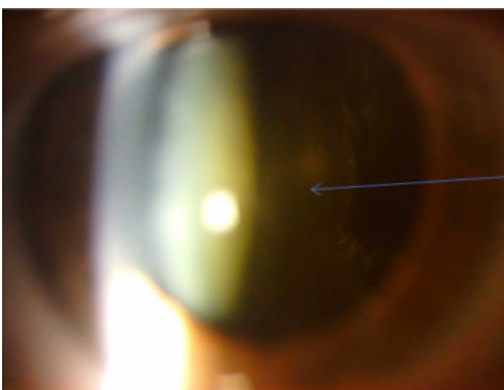
In the below photograph what is the lens status in this patient?

Answer:



In the below photograph state what the arrow is pointing to?

Answer:



Please provide any other additional comments:
