

Elective to the
refraction or vision
test. during



**ASSIGN
BUSTER**

Elective posting was carried out for two weeks from 20th November 2017 to 1st December 2017. During the electives posting, I was given chances to observe the whole process from consultation, eye examination, frames and lenses selection, eyeglasses making to spectacles dispensing and spectacles fitting. Objective 1 and 2 were done in the first week of the elective posting which objective 2 was mainly focused on the type of lenses and their functions which are more healthcare related.

Objective 3 was achieved in the second week of posting. **OBJECTIVE 1:** To gain fundamental knowledge needed in an optical setting. Vision screening is a short eye examination that used to check the presence of refractive errors. Refractive errors happen when the light unable to focus directly on retina due to the changes of the eye's length. The types of refractive errors are myopia, hyperopia, astigmatism and presbyopia.

(National Eye Institute, 2010) An auto-refractor will be used to give the eye-care providers a rough idea on the patients' prescription to proceed to the refraction or vision test. During the test, eye-care providers will use trial lens set with different strength, as shown in Figure 1 (appendix), to measure the refractive errors of an eye. Emmetropia is meant by normal vision with no refractive error. The light rays are directly focused on the retina and therefore, both near and distance objects can be seen in a clear vision.

Myopia, or near-sightedness, is a condition when the eye is too long, making the light rays from distant object to focus in front of the retina. Only the near

objects can be seen clearly. A myopic eye has too much plus power, hence, it is corrected using a minus spherical lens, as shown in Figure 2.

Hyperopia, or far-sightedness, happens when the eye is short, making the focal point of light fall behind the retina. Near objects cannot be seen clearly. A plus spherical lens in Figure 3 is required to treat this condition.

Astigmatism is mainly due to an irregular cornea shape or curvature of the eye's lens and prevents light rays from focusing properly on the retina. It causes two focal points and leads to blurred vision at any distance. A cylindrical lens, as shown in Figure 4, will be used to correct astigmatism. It can be in plus or minus lens.

Lastly, presbyopia is caused by the loss of accommodation of the crystalline lens during the aging process. People with presbyopia will find focusing on close objects difficult and will be treated with a plus spherical lens. (Kaiser & Friedman, 2014; The Vision Council, n.

d.-c) During the refraction test, an adjustable trial frame (Figure 5) will be used to hold three or four trial lenses for each eye. The thumbscrew mechanism on the side of the frame allows the rotation of cylindrical lenses to a proper axis. A cross cylinder, as shown in Figure 6, is used to identify the astigmatic axis and the exact cylinder power. The white marking on the cross cylinder indicates the plus cylinder axis while the axis marked in red is the minus cylinder axis. There are several dioptric strengths available but 0.

25 is normally used. A retinoscope in Figure 7 is an important instrument, especially in children and patients who are unable to answer accurately, to

estimate refractive errors by measuring the reflection of light off to the retina. (Stein, Stein, & Freeman, 2017) Digital pupillary distance meter in Figure 8 is used to measure the distance between pupils for eyeglasses fitting. It helps in determining the center point of the lens so that the eyes can see better after wearing the spectacles. Snellen chart measures the visual acuity whereby the patients need to tell the pointed alphabets and the eye-care providers will determine whether the patients need any prescription changes. A person with 6/6 vision is considered to have good vision. Duochrome test will also be carried out during the vision test. It tells the final corrective lens for the refractive error.

The panel is illuminated in red and green. Green colour with shorter wavelength will be focused in front of the retina while the red colour with longer wavelength will focus behind the retina. Hyperopic patients will see the letters on green panel more clearly and need more plus to bring the red wavelength to the retina. Myopic patients will find clearer letters on red panel and more minus is needed to bring green to the retina.

An emmetrope will see both equally blurred. (Stein et al., 2017) Some of the patients will consult eye-care providers by complaining headache.

Blurred vision caused by astigmatism and hyperopia requires the patients to squint in order to focus and see properly which results in headache.

Headache can also occur in a presbyopic patient due to the difficulty in focusing. These problems can be corrected by eyeglasses, provided that using it correctly. Besides that, glaucoma and cataracts can cause headache too. Inability of aqueous humour drainage causes the eye pressure to

increase which will eventually damage optic nerve and leads to severe headache. Patients need to seek for ophthalmologist to control the condition.

Cataracts cause headache by making the eyes to work harder as the vision became limited due to the clouding of eye's lens. (Sally Robertson, 2016) Not only refractive errors, but blurred vision can be a manifestation of severe eye problem. For diabetic patients, unexplained blurred vision might indicate the onset of diabetic retinopathy. Vitreous haemorrhage can prevent the light from entering eyes, therefore, it results in blurred vision.

Besides that, blurred vision can also be caused by glaucoma and cataracts.

Trauma or injury to the eyes and eye infection will cause the patient to experience blurred vision too. (Aimee Rodrigues, 2018) Sudden vision loss can happen unilaterally or bilaterally, and temporarily or permanently. The causes are usually related to the abnormalities of retina or optic nerves. Trauma can be one of the causes that results in sudden vision loss.

(Brady, n. d.) Not only sudden blurred vision, but retinal detachment can cause sudden blindness too. Retinal detachment and retinal vascular occlusion can cause sudden vision loss whereas gradual vision loss is usually happens in chronic simple glaucoma and cataracts. Therefore, it is important to know whether the patients' vision loss occur suddenly or gradually. (Swartz, 2014)