

## Chapter 13

# Fundus Examination in Pediatric Patients: Direct Ophthalmoscope and PanOptic Ophthalmoscope

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### **ABSTRACT**

*There are a number of different pieces of equipment and techniques available for examination of the fundus of a pediatric patient. Two of these tools are handheld devices, the direct ophthalmoscope and PanOptic™ ophthalmoscope. Both of these devices allow for examination of the posterior pole of the eye. This chapter will discuss the indications, advantages, and disadvantages of both of these pieces of equipment in addition to how to use the equipment to examine the posterior segment of a pediatric patient.*

### **INTRODUCTION**

The direct ophthalmoscope can be used to examine the posterior pole, macula and ocular media in both dilated and undilated fundi. The handheld direct ophthalmoscope produces an erect magnified real image. There are several different filters that can be used. The size of the illumination source can be adjusted to compensate for the size of the patient's pupil. Direct ophthalmoscopy can also be used to evaluate the eye's fixation pattern using visuoscopy. Visuoscopy testing is best performed when the patient is dilated.

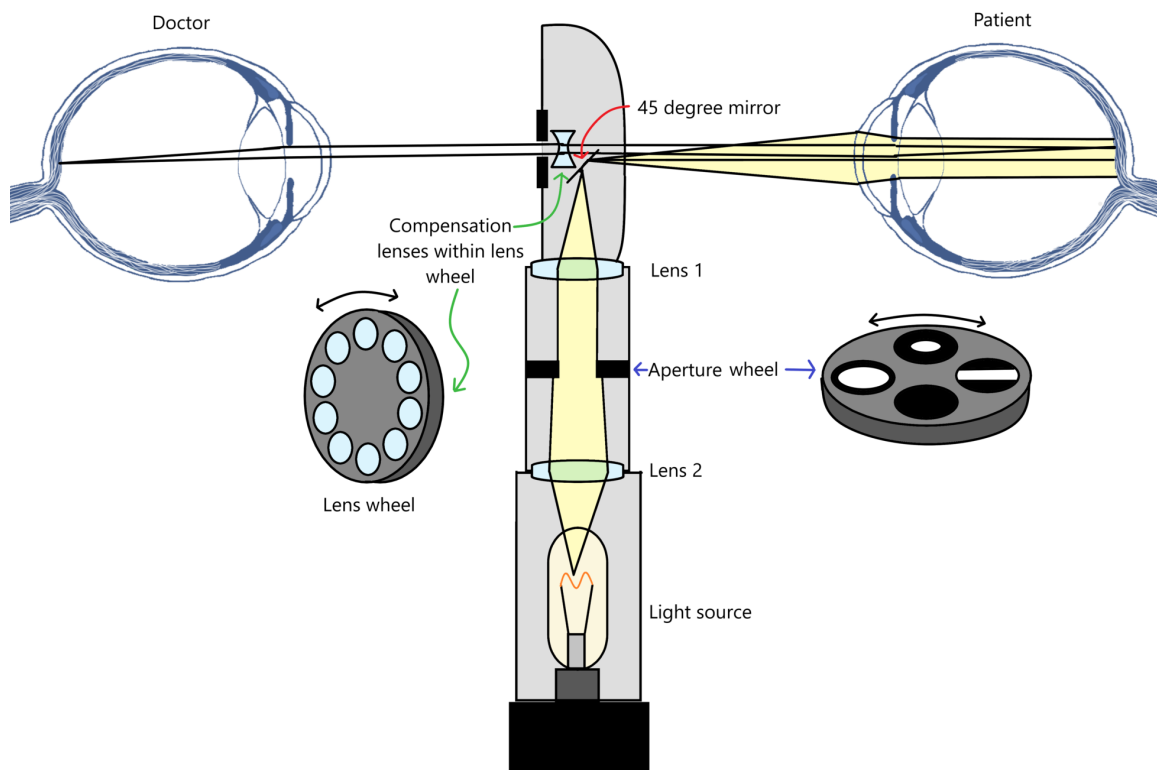
Direct ophthalmoscopy can be performed on children of all ages, and is especially helpful for toddlers, pre-school and school aged children who are unable to be positioned in the slit lamp for examination of the fundus with lenses such as a 90D or 78D. It is useful as well for examining patients with undilated pupils, providing increased magnification for examination of the posterior pole. While a direct ophthalmoscope can be used on infants as well, other methods may allow for better views of the posterior pole given limited cooperation with this youngest age group.

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## **BACKGROUND**

The direct ophthalmoscope head connects to a handle (the power source). The head contains plus and minus power lenses used to compensate for refractive errors. There is an illumination system and a viewing system (Figure 1). The illumination system is composed of an incandescent light source, an aperture, two lenses and a small 45° mirror (Timberlake & Kennedy, 2005). It also contains a wheel that has multiple different apertures. Most direct ophthalmoscopes have two or three different size white light circles, blue and green filters, a slit and a visuoscopy target. A half circle is another type of aperture available. The viewing system is composed of condensing lenses and a viewing aperture. Condensing lenses can range in power from high plus to high minus lenses with the range varying depending on the ophthalmoscope manufacturer. The role of the condensing lenses is to allow for the image of the retina to be brought into focus if the eye is not emmetropic.

*Figure 1. Image of the different systems that compose a direct ophthalmoscope. Source: Tak-Man Kimberly Fung OD, 2021 (Adapted from [Cordero, 2016])*



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