A Simple Model for Demonstrating Abnormal Slitlamp Findings

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This article describes a simple, inexpensive model for demonstrating abnormal slitlamp findings to students, residents, and general physicians.


One of the challenges facing the ophthalmologist-teacher is to demonstrate abnormal physical findings to medical students, beginning ophthalmology residents, and general physicians at the time dictated by the students' schedules rather than by the availability of patients in the clinic. Abnormalities of the ocular fundus and external eye are effectively displayed by good-quality photographs, but abnormal slitlamp findings, particularly "cells" and "flare," are extremely difficult to capture on film.

To solve the problem of demonstrating these abnormal slitlamp findings to students on a "demand" basis, a simple, inexpensive model was constructed using common laboratory and household materials. This model simulates the optical section of the cornea, the presence of cells and flare in the anterior chamber, and the variation of the thickness of the optical section with the varying thickness of the cornea.

Our model was constructed using a screw-top glass vial measuring 15 mm in diameter and 45 mm in height (# 03-339-21B, Fisher Scientific, Pittsburgh, Pa) (Figure 1). This vial was filled with colorless baking soda flavored mouthwash (Scope, Proctor & Gamble Co, Cincinnati, Ohio) to which a small amount of face powder was added by raking particles from the powder puff into the vial. Light-colored powder is preferable to a darker shade. The amount of face powder can be varied until the proper effect is obtained, or several vials can be prepared using differing concentrations of particles to simulate 1+, 2+, or 3+ cells. Although the face powder particles are larger than the inflammatory cells they represent, they are some of the smallest insoluble particles commonly available around the house or in the laboratory.

These components were chosen for their stability and availability. Our original model has been stable for almost 2 years and does not appear to have become contaminated or allowed bacterial or fungal growth, as some protein compounds, such as gelatin, might have. A control vial may also be prepared using distilled water or alcohol.

The vial can be held in front of the slitlamp by the teacher or the student and observed, displaying several different views that simulate clinical observations of abnormal slitlamp findings. An alternate method of support is to use 2 test tube clamps fastened to the uprights of the slitlamp. By positioning the vial horizontally, the student can focus the thin beam of the slitlamp on the outer surface of the vial and view what is equivalent to an optical section of the cornea (Figure 2). The vial has a 7.5-mm radius of curvature, which approximates that of the normal cornea. The student can see the anterior surface of the vial, the dark band representing the wall of the vial, and the interface between the inner surface of the vial wall and the liquid contents. By rubbing a finger over the surface of the vial and depositing skin oils there, the outer surface will become more visible and allow
the student to define the various levels of the optical section more easily.

The slitlamp is then focused closer to the vial, bringing deeper levels of the fluid into focus and demonstrating “cells” and “flare” (Figure 3). The “flare” is not heavy but is easily visible. Shaking the vial will cause the “cells” to move in currents within the vial as they do in the anterior chamber of the eye; however, their direction is not predictable. This view closely approximates the clinical appearance of actual cells and flare in an inflamed eye as viewed through the slitlamp.

By viewing the bottom of the vial with the thin beam of the slitlamp, the increased thickness of the center of the vial can easily be seen (Figure 4). This simulates the variations in thickness or alterations in contour of the cornea (as might be seen in keratoconus or localized corneal edema), lens (as in posterior lenticous), or other transparent ocular tissues.

A simple, inexpensive model for demonstrating the slitlamp appearance of an optical section, cells in the anterior chamber, flare in the anterior chamber, and variations in thickness and contour of ocular tissue has been described. The model closely approximates these clinical examination findings in a diseased eye, is available for use at all times, can be carried from place to place in one’s pocket, and does not depend on patient availability or cooperation. In addition, it does not subject a patient with iritis to extended and uncomfortable examinations by multiple students. The author submits this model as a simple, effective way to demonstrate abnormal slitlamp findings to medical students, beginning ophthalmology residents, and general physicians.

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