

**TRAINING DEVICE FOR DIGITAL
ASSESSMENT OF INTRAOCULAR
PRESSURE**

**CROSS-REFERENCE TO RELATED
APPLICATIONS**

Not Applicable.

**STATEMENT REGARDING FEDERALLY
SPONSORED RESEARCH OR DEVELOPMENT**

Not Applicable.

BACKGROUND OF THE INVENTION

Intraocular Pressure (IOP) is an extremely important characteristic of a physical state of the eye, especially in glaucoma patients. Nearly one percent of the total population of the United States suffers from this form of blindness. Glaucoma is characterized by an increase in IOP which causes visual defects and ultimately may cause irreversible blindness. As the IOP rises to abnormal levels, damage is caused to the ocular nerve and surrounding retinal tissues. The patient seldom experiences any symptoms that might indicate that the disease exists until major damage occurs.

As part of many standard eye examinations, a test of IOP known as tonometry is performed to detect the early stages of glaucoma. Tonometry broadly relates to the measurement of tension in living tissue and has special meaning in ophthalmology relating to IOP and the health of the eye. Pressure in the eye is not measured directly, but is typically inferred by measuring the eye's response to pressure exerted upon the cornea.

A measure of the pressure within the eye is conventionally obtained by indenting to a given depth or flattening to a given extent a portion of a measurement surface of the eye, usually the cornea, and then determining the amount of force required to produce the given flattening or indentation. The flattening or indentation is resisted by the resiliency of the measurement surface and by the internal pressure of the eyeball. The determined force is then converted to a measurement of IOP.

In some occasions, health care professionals are required to assess IOP digitally (i.e., with their fingertip). The ability to digitally determine IOP is critical in trauma cases where time is of the essence and proper measuring devices may not be available. Additionally, measuring devices may not be available in some locations. It has been proven that a minimal amount of training allows a health care professional to accurately assess IOP digitally. In the past, this type of training has been done on cadaveric human or animal eyes which has many drawbacks, among them being the problems associated with obtaining and maintaining human or animal tissue over long periods of time and to eliminate any possibility of disease transmission from contaminated samples.

BRIEF SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an easily calibrated, reliable, and repeatable training device for determining IOP that does not use cadaveric eyes.

A further object of the present invention is to provide an IOP training device that is easily calibrated without the necessity for external fluid filled syringes or infusion canulas.

Still other objects and advantages of the present invention will become readily apparent to those skilled in this art from

the detailed description, wherein only the preferred embodiment of the present invention is shown and described, simply by way of illustration of the best mode contemplated of carrying out the present invention. As will be realized, the present invention is capable of other and different embodiments, and its several details are capable of modifications in various obvious respects, all without departing from the present invention. Accordingly, the drawings and descriptions are to be regarded as illustrative in nature, and not as restrictive.

These and other objects are achieved by a training device for digital assessment of intraocular pressure that includes a body, top, bottom cover, and two legs. The legs are designed such that the device can be set on a table. The body contains ten cylindrical cavities, with each cavity being one-inch in diameter. The depth of each cavity is selected such that the sloped bottom of the one-inch cavity intersects with a 0.625-inch diameter hole that is drilled into the body from the top. The ten holes in the top have a countersink to provide a tapered circular opening in the top. The top is attached to the body by a series of machine screws that are threaded into mating threaded holes in the body. Screws are located concentrically around each cavity so as to provide a tight seal between the two flat surfaces. A thin, circular piece of latex membrane approximately one-inch in diameter, with a thickness of 0.005 inches is located directly over each 0.625-inch diameter hole. Each membrane is tightly pressed into place between the body and the top as the screws are tightened to fasten the top to the body.

The bottom is attached to the body with a series of machine screws that are threaded into mating threaded holes in the body. These screws are located concentrically around each cavity to provide a tight seal between the two flat surfaces. The bottom contains ten tapped holes, the centers of which are aligned with the centers of the cavities. Threaded into each tapped hole is a threaded rod with sufficient length to permit the threaded rod to be rotated up into the cavity to cause a plastic plunger, containing another cylindrical cavity sized to accept the threaded rod to move longitudinally into or out of this cavity. A hexagonal nut is threaded onto the rod prior to threading the rod into the bottom. Each threaded rod may then be locked into place by rotating a nut clockwise, while preventing the rotation of the threaded rod until the nut jams against the bottom. A plastic plunger is sized so as to easily slide into and out of the cavity in the body without binding. The rotated position of the threaded rod with respect to the bottom determines the location of the plastic plunger in the cavity. Gravity, plus the internal pressure of the liquid-filled bladder, causes the plastic plunger to return to the vicinity of the bottom of the cylindrical cavity as the threaded rod is turned counter-clockwise to cause the threaded rod to move longitudinally out of its cylindrical cavity.

Pressurization of each latex membrane surface occurs in the following manner. A spherical latex bladder with a diameter of approximately 0.78-inches is inserted inside each cavity. Each bladder contains approximately 0.132-ounces of a non-compressible liquid. Each bladder can be fabricated using latex material with a thickness of 0.005-inches. Care must be taken to exclude all air from the bladder. The exact quantity of liquid contained in each bladder is not critical, since the liquid is compressed by the plastic plunger as the threaded rod is rotated clockwise. However, the volume of liquid must be sufficient to achieve the desired pressure when the pressure adjusting plunger is situated centrally in the cavity. Excessive liquid in the bladder makes it difficult to reduce the internal pressure to