

## VARIABLE PATHOLOGICAL AND SURGICAL EYE MODEL AND METHOD RELATED THERETO

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to three dimensional medical models and methods related thereto, and more particularly relates to three dimensional eye models and methods related thereto.

#### 2. Description of the Related Art

Prior three dimensional eye models have existed, and have generally modeled a healthy eye. The use of such models of healthy eyes have been useful as teaching aids and in demonstrating normal anatomy and physiology. Such models however have led to confusion and difficulty in permitting physicians and more specifically eye doctors and eye surgeons to explain various pathological states and surgical procedures for patients, patients' families and medical students. For example, prior eye models have not been useful in selectively showing some specific tissue of the eye which is commonly afflicted by infections, irritations and other pathology or disease process. Prior eye models have failed to show common conjunctival afflictions such as conjunctival hemorrhage, abrasion, laceration, pinguecula and allergic, mechanical or infectious conjunctivitis. Also prior models have not shown a distinct and realistic vitreous fluid, representing the vitreous humor of the human eye, and therefore not representing cellular debris in the vitreous, "vitreous floaters." Prior models have not been useful in showing corneal pathology, such as corneal abrasions, corneal ulcers, corneal lacerations, and pterygium. Other anomalies of the cornea such as neovascularization, hemorrhages and clear corneal incision for cataract/lens implant surgery have not been demonstrated before. Specific and detailed retinal conditions, and retinal disease will be displayed in this improved model, whereas prior models have failed to detail such important situations such as retinal detachments and retinal breaks, like retinal tears and retinal holes. Also, no prior art exists on eye models detailing the retinal conditions and diseases such as, choroidal nevi, lattice degeneration, choroidal melanoma, macular degeneration, and diabetic retinopathy. Prior models have never demonstrated the human eyelid in normal anatomical conditions or in pathologic states as well. Therefore, prior models have not been useful for exhibiting human eyelid anatomy or related eyelid disease states, for example eyelid disorders such as chalazion, dermatochalasis, hordeolum, ptosis and other eyelid abnormalities.

Consequently, there is a need and a desire to provide an eye model and related method for selectively modeling specific (realistic, distinct) anatomical features of the human eye as well as selectively demonstrating and illustrating various disease states. There is also a need to provide such selective and realistic models to enable health care providers and educators a means for teaching, demonstrating and otherwise communicating in a precise informative manner the conditions (disease states) to students, patients, family members of afflicted patients and health care providers.

### SUMMARY OF THE INVENTION

The present invention involves a structural eye assembly comprising replaceable components exhibiting healthy conditions, pathological states and post-surgical conditions. The assembly comprises a spherical eye body of structural (sturdy) soft and somewhat pliable material in the shape of

the human eye, preferably in an enlarged scale relative to the human eye for the ease of observation of the various structural components. The assembly includes a cornea which is replaceable with a plurality of corneas exhibiting various pathological structures and structural damages. The removable cornea is made of a clear, soft and pliable material to simulate a human cornea. Corneal pathological states is exhibited on various replaceable corneas to allow the educator or physician to selectively demonstrate the pathological state to the student or patient. The crystalline lens is also removable and the assembly includes replaceable lenses which exhibit various types and stages of cataract development and pathological structures. Also contained within this eye model assembly will be a liquid vitreous body, to demonstrate the vitreous humor in a more realistic nature than previous models and contained within the liquid vitreous are "floaters" to simulate the human affliction of vitreous floaters.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the structural eye assembly according to the present invention;

FIG. 2 is a clear vitreous chamber having vitreous floaters;

FIG. 3 is a vertical cross sectional view of a structural eye sub assembly;

FIG. 4 is a prospective view of an eye subassembly exhibiting a scleral buckling procedure;

FIG. 5 is a cut away view of a silicon pad in an eye body sub assembly illustrating the results of a scleral buckling procedure;

FIG. 6 is a vertical cross sectional view of a lens of the sub assembly;

FIG. 7 is a front elevational view of a lens exhibiting a pathological structure;

FIG. 8 is a side elevational view of an anterior chamber insert having floaters;

FIG. 9 is a cut away view of an eye sub assembly having an interior insert having floaters;

FIG. 10a is a front elevational view of an eyelid having a chalazion;

FIG. 10b is a front elevational view of an eyelid having a styte;

FIG. 10c is a front elevational view of an eyelid having a dermatochalasis;

FIG. 10d is a cut away view of an eyelid having ptosis;

FIG. 10e is a front elevational view of an eyelid having a subconjunctival hemorrhage;

FIG. 11a is a front elevational view of a cornea having an abrasion;

FIG. 11b is a front elevational view of a cornea having a laceration;

FIG. 11c is a front elevational view of a cornea having a foreign body imbedded therein;

FIG. 11d is a front elevational view of a cornea having a corneal ulcer;

FIG. 12a is a vertical cross sectional view of a normal lens with a normal nucleus;

FIG. 12b is a front elevational view of a normal lens with a normal nucleus;

FIG. 12c is a vertical cross sectional view of a lens having a nuclear cataract;

FIG. 12d is a front elevational view of a lens having a nuclear cataract;