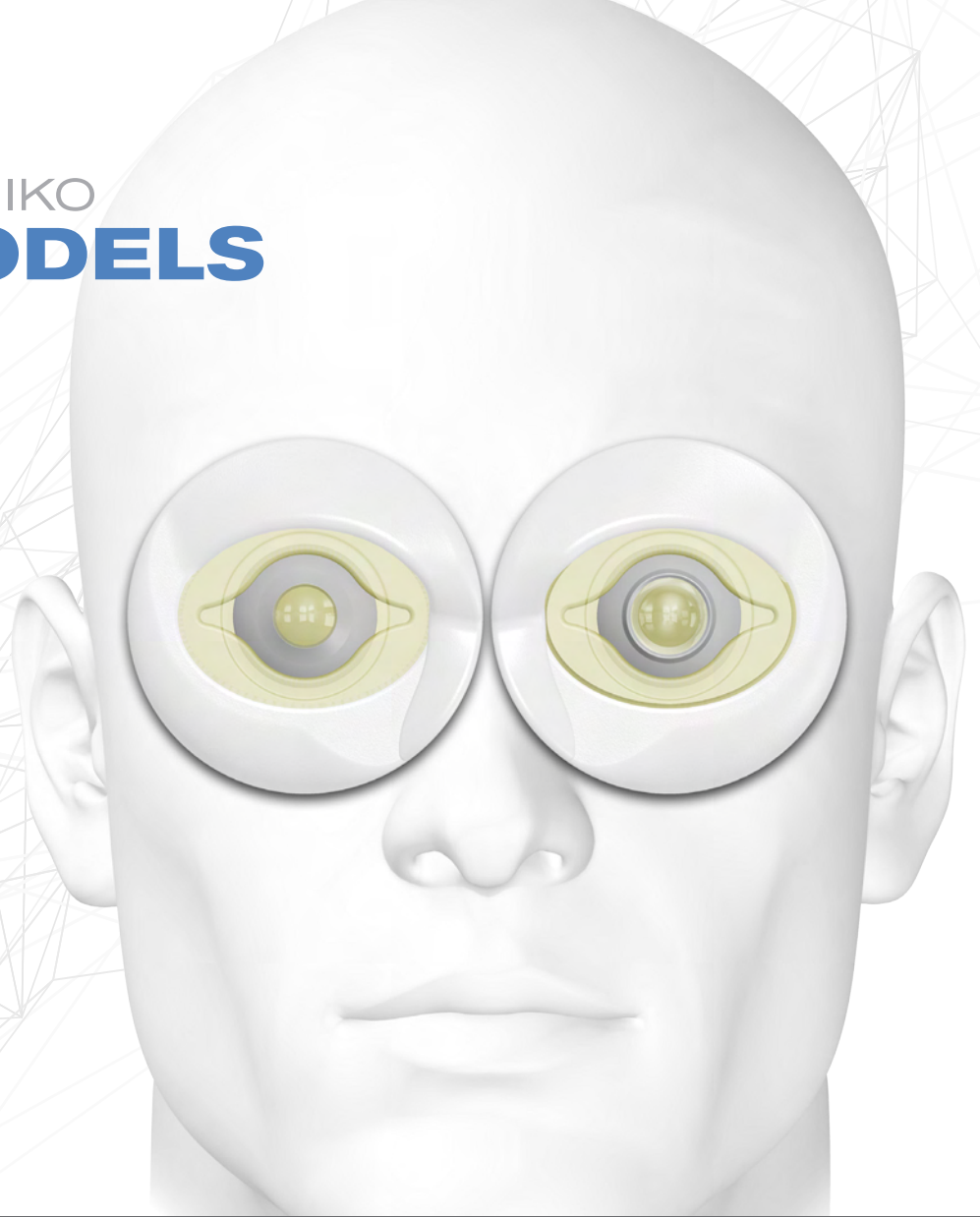


BIONIKO  
**MODELS**



OPHTHALMIC  
**SURGICAL MODELS**

**BIONIKO** designs innovative surgical models, task trainers and teaching tools for the ophthalmic industry.

Our surgical models present the user with dexterity and coordination challenges of common surgical scenarios, allowing fundamental skills to be practiced using real surgical instruments. The models aim to replicate consistency, proportions and continuous interfaces between different ocular sub-structures, providing high fidelity tissue simulators that can be cut, dissected and sutured.

Surgical models allow faculty to demonstrate surgical technique. Users gain proficiency and perfect surgical skills in a safe, realistic, and non-stressful environment. Furthermore, synthetic models enable repeatable and standardized assessment of surgical technique.

Our surgical models can be easily incorporated into any training program to help develop and perfect:

Spatial Perception: Surgical approach, orientation, depth and scale

Motor Skills: Instrument control, muscle memory and hand-eye coordination

Technical Understanding: Instrumentation, surgical sequence and best practices





## FEATURES AND BENEFITS

### AVAILABLE

Training on demand for individual pace and needs

### PORTABLE

Teach in the classroom, train in the OR and practice at home

### REPEATABLE

Standardize training and assessment without model variability

### AFFORDABLE

Surgical simulation tools at textbook cost

### SIMPLE

Ready to use with minimum setup and assembly

### SYNTHETIC

No refrigeration or special disposal required

# KERATO

## Suturing Task



Suturing is a fundamental skill in ophthalmic surgery. However, it is a common weakness among aspiring surgeons due to the lack of operative experience and suitable training models. This skill is absent in virtual reality tools, and animal models are not accurate or repeatable.

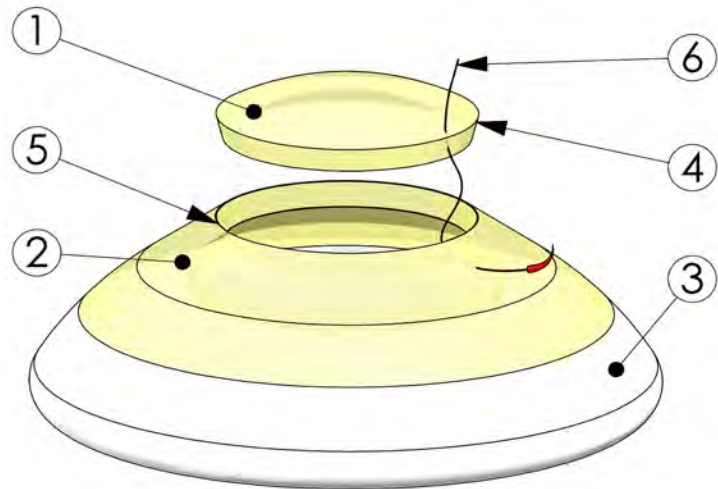
By presenting the main challenges of a penetrating keratoplasty (PKP) scenario, the **KERATO** task allows users to learn, train and perfect the skills required to perform precise suturing under a microscope.

The **KERATO** task consists in suturing a corneal graft to a host limbus using real surgical instruments. The user will need to properly handle forceps, needle holder, scissors and 10-0 suture to complete the task.

With practice the user will gain confidence, reduce time to completion, improve suture radiality and spacing, maintain even and safe distance to tissue edge and gain better feel for suture tension during knot creation.

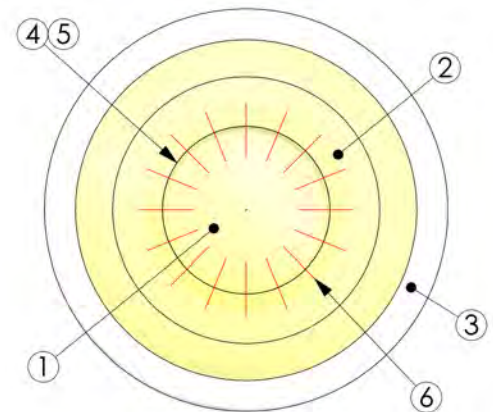
Pat. Pending

- 1 - CORNEA
- 2 - LIMBUS
- 3 - SCLERA
- 4 - GRAFT EDGE
- 5 - RECIPIENT EDGE
- 6 - SUTURE



## FEATURES AND BENEFITS

- Accurate tissue proportions
- Realistic tissue feel
- Repeatable and available
- Encourages awareness of tissue hydration
- Practice microsuturing techniques (continous/interrupted)
- Improve confidence and decrease fatigue
- Improve time to completion (Decrease OR time)
- Self asses execution by checking for:
  - Suture radially
  - Safe and even distance to tissue edge
  - Knot tension
  - Even spacing between sutures



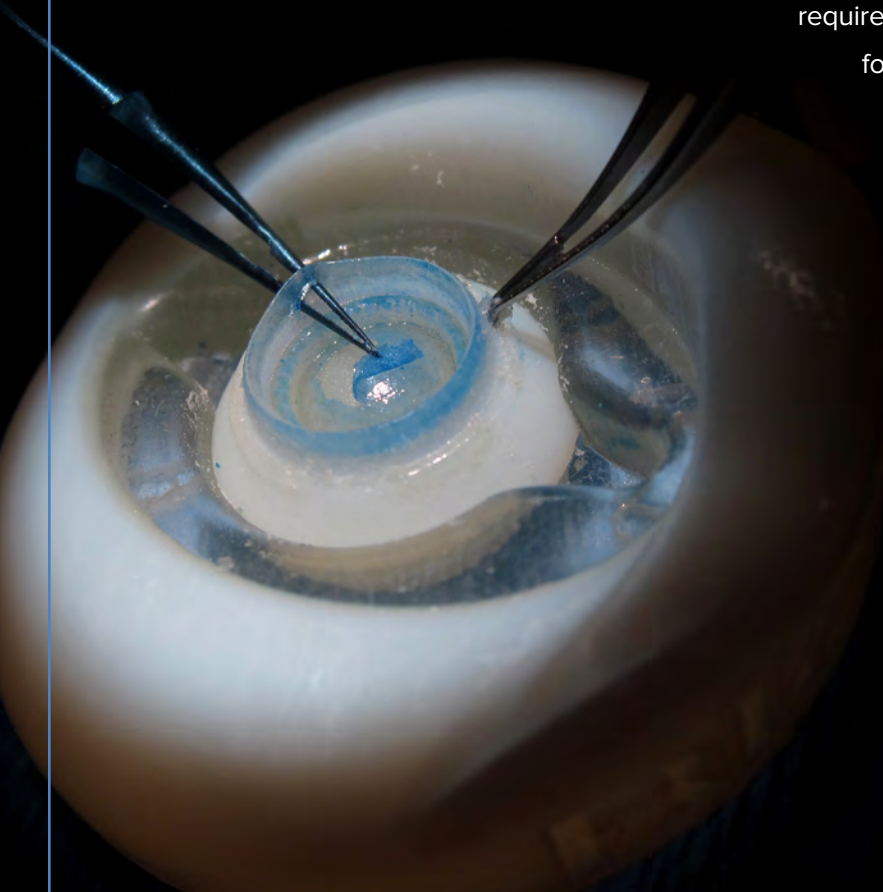
# RHEXIS

## Instrument Control Task



Instrument control through ports is a fundamental skill in ophthalmic surgery. However, it is a common weakness among aspiring surgeons due to the lack of operative experience and suitable feedback from available models.

By presenting the main challenges of a capsulorhexis scenario, the **RHEXIS** task allows users to learn, train and perfect the fine motor skills required to properly use the wound as a fulcrum point for instrument movement.



The task consists in performing a capsulorhexis by manipulating instruments through an incision on a delicate limbus rim. Improper instrument control will cause stress and damage to the limbus, providing feedback to the user. In addition to a proper capsulorhexis, minimizing damage to the limbus rim is key to complete the task successfully. With practice the user will increase confidence, reduce time to completion, improve rhexis shape, size and centration, and minimize stress on the wound.

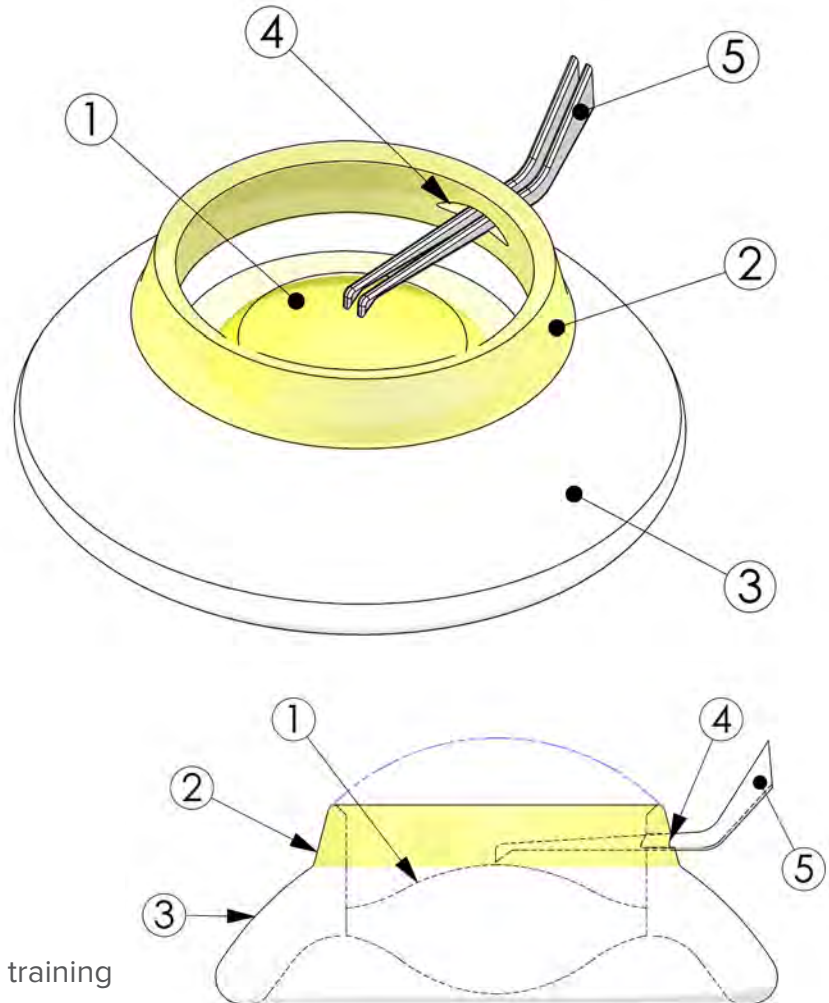
Pat. Pending



- 1 - LENS CAPSULE
- 2 - LIMBUS RIDGE
- 3 - SCLERA
- 4 - WOUND
- 5 - INSTRUMENT

## FEATURES AND BENEFITS

- Repeatable and available
- Limbus ridge designed to provide instrument handling feedback
- Encourages good practices:
  - posterior incisions
  - regrasping
  - wound awareness
- Improve surgical skills confidence
- Develop instrument control
- Decrease reliance on donor tissue for training
- Decrease wound size
- Improve time to completion
- Asses instrument control by checking wound integrity
- Assess execution by measuring rhexis size and centration

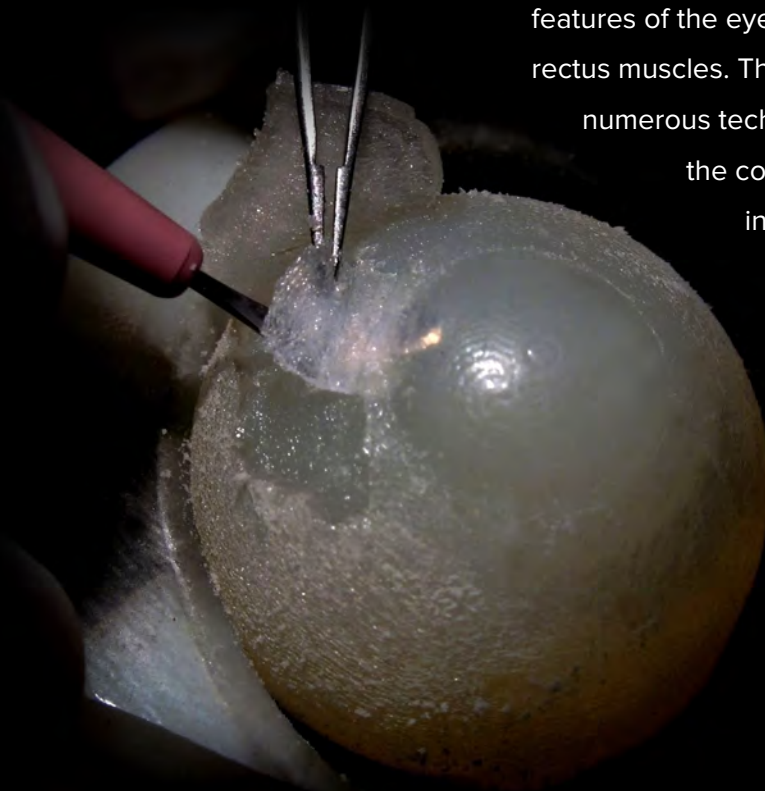


# OJOS

## Model Eyes



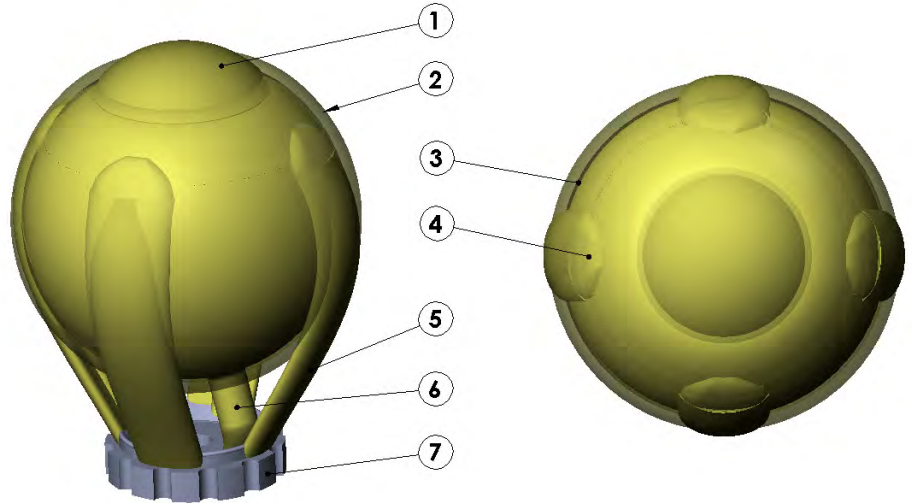
The **OJOS** Extraocular model simulates the external anatomical features of the eye, including conjunctiva, sclera, cornea and rectus muscles. This model allows demonstration and practice of numerous techniques requiring dissection and manipulation of the conjunctiva and sclera. Procedures encountered in glaucoma surgery, such as shunt implants and trabeculectomies, can be demonstrated and practiced on the model. The **OJOS** model can be used in conjunction with the **FLEX-ORBIT** platform for added challenge and realism.



Pat. Pending



- 1 - CORNEA
- 2 - CONJUNTIVA
- 3 - SCLERA
- 4 - MUSCLE INSERTION
- 5 - RECTUS MUSCLE
- 6 - OPTIC NERVE
- 7 - BASE



## FEATURES AND BENEFITS

- “Loose” and continuous conjunctiva/tenon’s layer for realistic dissections
- Standardize your instruction and assessment around a consistent model
- Long shelf life
- No refrigeration needed
- No biohazard handling or disposal required
- Available on demand
- Decrease reliance on donor/animal tissue for training

# PTERYGIUM

## Model



The PTERYGIUM model is based on a Pterygium excision with conjunctival autograft scenario. Users will gain valuable hands-on training in delicate ocular surface dissection and suturing techniques, which are essential skills in ophthalmic surgery.

The PTERYGIUM model allows the user to demonstrate, practice or evaluate dissection of the pterygium head and body; autograft sizing, dissection and harvesting; placement and suturing of graft over scleral bed.

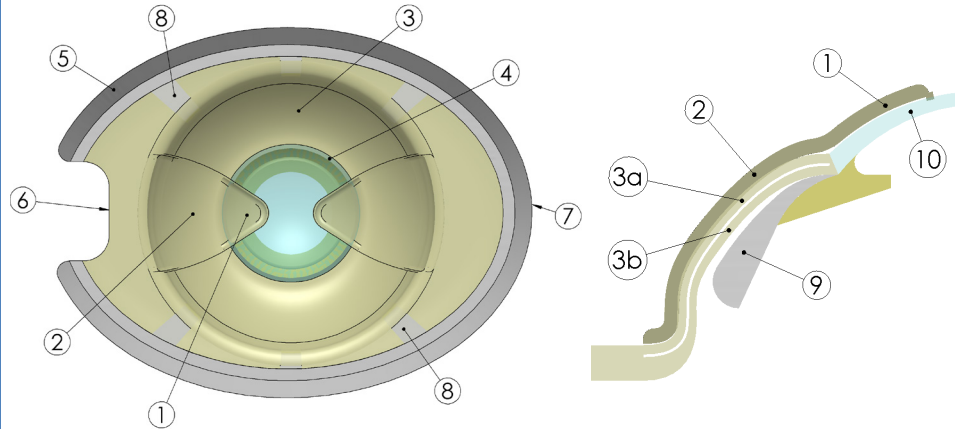
The FLEX-ORBIT (Sold separately) serves as the holder for the PTERYGIUM model and provides support, frame of reference and the challenges posed by facial features surrounding the eye.



Pat. Pending

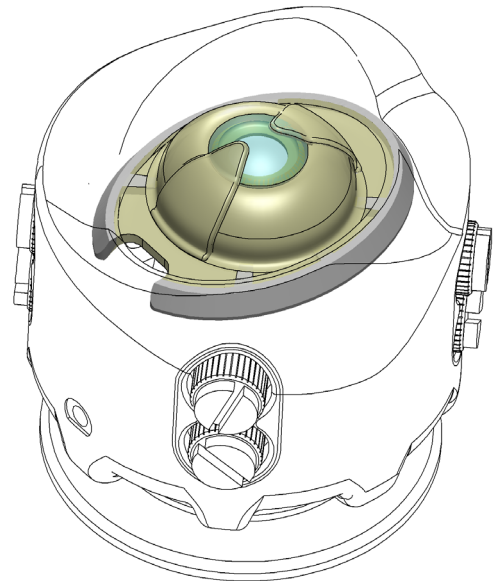
# PTERYGIUM

- 1 - PTERYGIUM HEAD
- 2 - PTERYGIUM BODY
- 3 - CONJUNCTIVA
  - a. BULBAR CONJUNCTIVA
  - b. TENON'S CAPSULE
- 4 - LIMBUS
- 5 - SNAP RING
- 6 - SNAP RING GAP (TEMPORAL)
- 7 - SNAP RING APEX (NASAL)
- 8 - SCLERA
- 9 - CORNEA



## FEATURES AND BENEFITS

- Practice excision techniques, complex conjunctival dissection and conjunctival suturing
- Bilateral pterygia allows two simulations per model
- Layered conjunctiva (Conjunctiva- Tenon's) allows realistic autograft dissection
- Works with FLEX-ORBIT platform



# FUNDUS

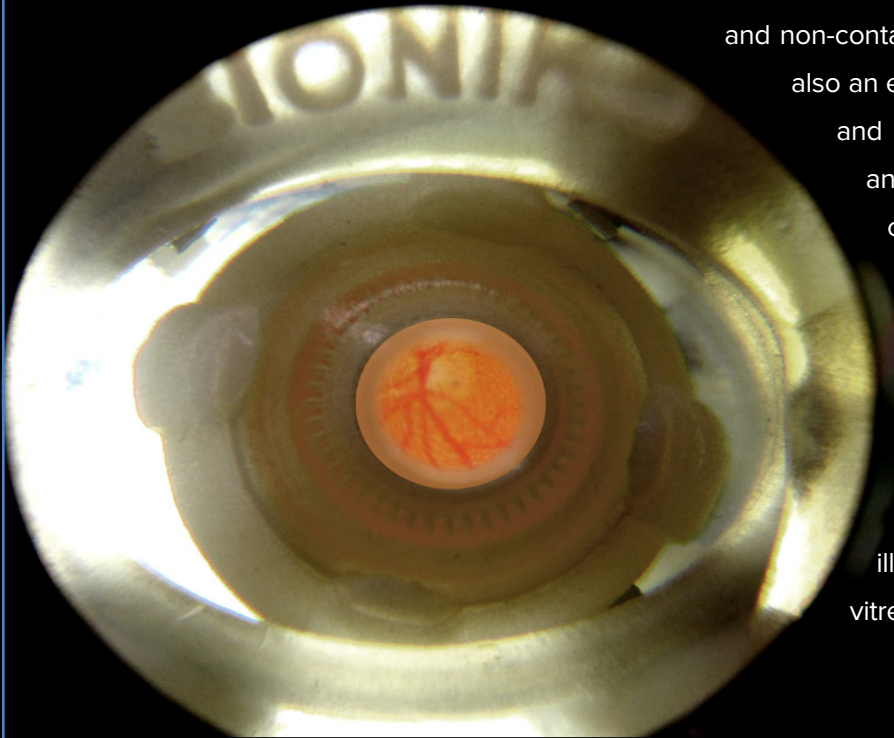
## Model



FUNDUS is an innovative model for posterior segment training and simulation. Its posterior segment includes a photo-realistic model of the central retina featuring macula/fovea, optic disc/cup and retinal vasculature with accurate superior and inferior arcades. Its anterior segment includes a central optical element and a flexible pars plana that allows surgical intervention.

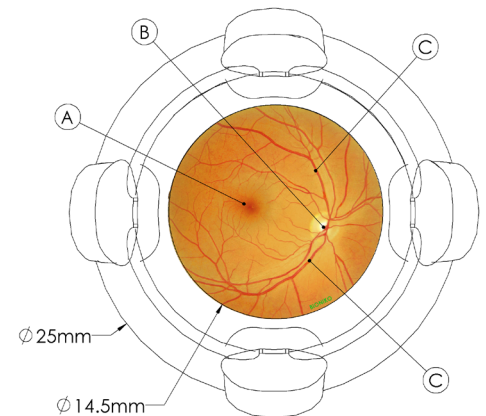
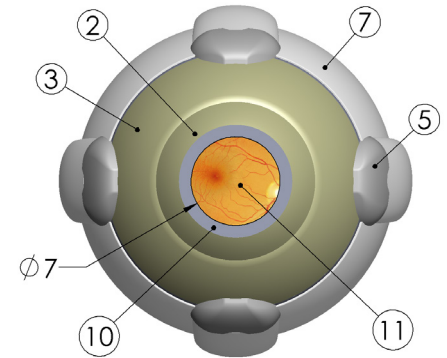
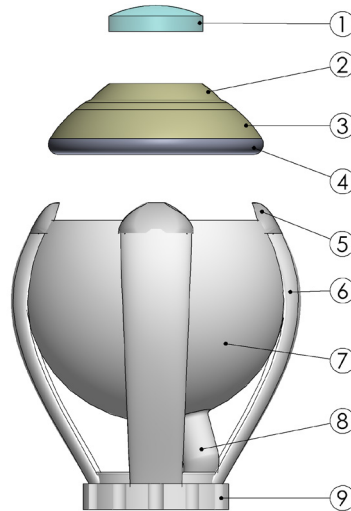
The model facilitates training in basic retinal examination technique and instrumentation such as indirect ophthalmoscopy, slit-lamp, contact and non-contact retinal lenses, and retinal cameras. It is also an exceptional tool for demonstration, practice and assessment of retinal instrument handling and microscope skills such as use of surgical contacts lenses, non-contact systems and inverters.

Its modular design enables insertion of foreign bodies or vitreous substitutes to enhance training scenarios. It also allows optical element removal and trans-illumination to facilitate practice where vitreo-retinal equipment is unavailable.



Pat. Pending

- 1 - OPTICAL ELEMENT\* (50D)
- 2 - CORNEAL RIM
- 3 - PARS PLANA
- 4 - SUPPORT RING
- 5 - MUSCLE INSERTION
- 6 - RECTUS MUSCLE
- 7 - GLOBE
- 8 - OPTIC NERVE
- 9 - BASE
- 10 - IRIS\*
- 11 - FUNDUS\*
  - A - MACULA / FOVEA
  - B- OPTIC DISC / CUP
  - C - VASCULATURE/ ARCADE



## FEATURES AND BENEFITS

- Retinal model with macula/fovea, optic disc/cup and retinal vasculature with accurate superior and inferior arcades
- Removable optical element simulates optical power of the eye
- Removable anterior segment facilitates creation of surgical scenarios
- Flexible pars plana allows surgical instrument insertion
- Translucent body enables transmitted/retro illumination

*\* Special orders: Iris 1mm-8mm, optical element AR coating and ILM,*

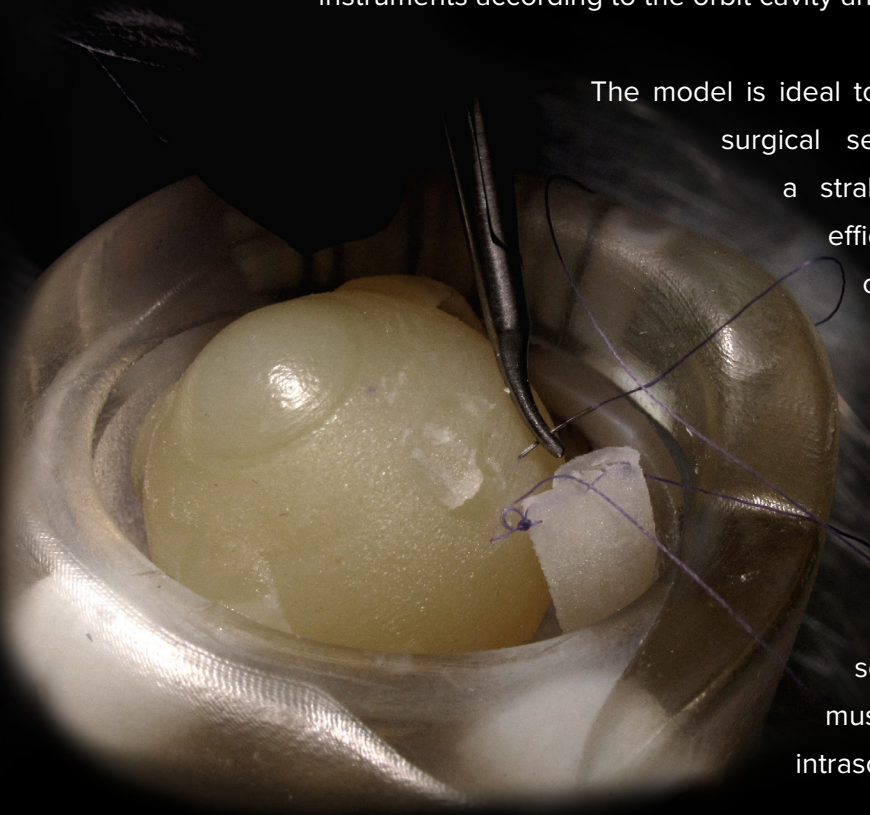


# STRABISMUS

## Model



Strabismus and other eye-muscle related surgeries can be difficult to simulate with animal or donor tissue, since enucleated globes lack muscles and their attachments to the orbit. The STRABISMUS model features the four rectus muscles and works with the FLEX-ORBIT to provide a natural attachment point at the back of the orbit. The orbit also provides reference and realism by challenging the user to manipulate instruments according to the orbit cavity and facial structures around the eye.



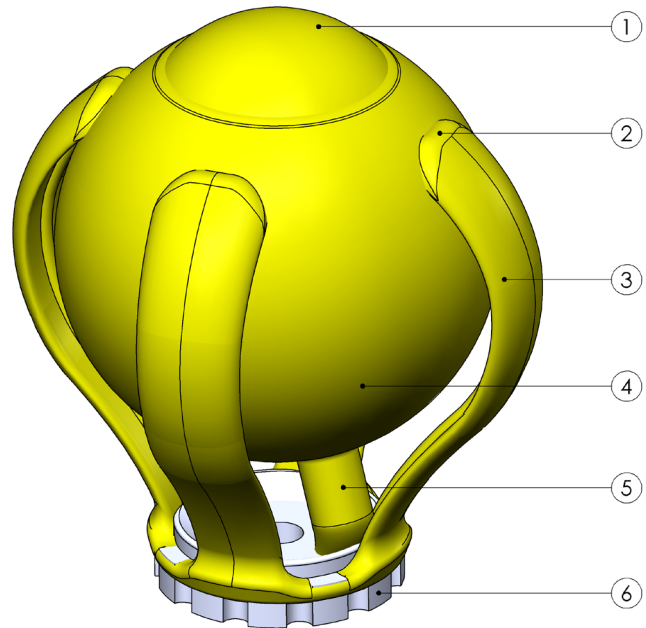
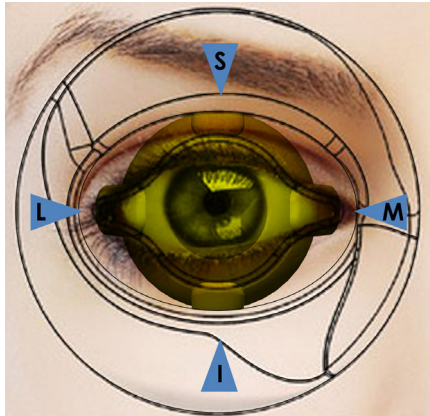
The model is ideal to demonstrate, practice and perfect the surgical sequence and instrument handling of a strabismus surgery scenario. Learning to efficiently and precisely hook the muscles on a first attempt is a fundamental skill for novice surgeons. The model allows the users to develop proper suture placement and practice of adjustable suturing techniques and permanent knots.

The model is an excellent tool for self-assessment and evaluation of final muscle and eye position in the orbit and intrascleral pass technique.



# STRABISMUS

- 1 - CORNEA
- 2 - MUSCLE INSERTION
- 3 - RECTUS MUSCLE
- 4 - GLOBE
- 5 - OPTIC NERVE
- 6 - BASE



## FEATURES AND BENEFITS

- Realistic muscle traction and feel
- Practice surgical procedure sequence and manipulation of instruments
- Available on demand
- Practice muscle suturing techniques that are not available with animal tissue
- Permits use of subcleral dye injections to obtain suture depth feedback
- Standardize your instruction and assessment around a consistent model



Model

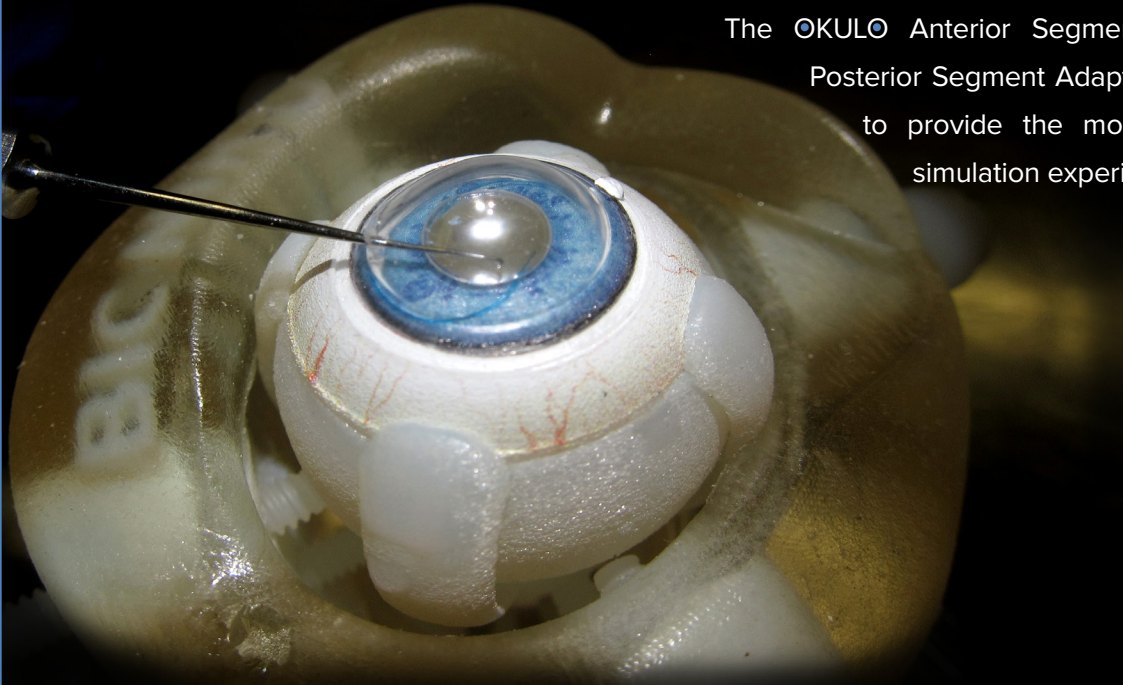


The OKULO Model is a modular and configurable platform for anterior segment surgery simulation. It features a clear cornea, a flexible pigmented iris and a removable/ crystalline lens.

This versatile model offers various iris pigmentation and pupil size options. Choose between our standard blue or brown iris and 5 or 8 mm pupil size. The iris can also be customized to create specific training scenarios.

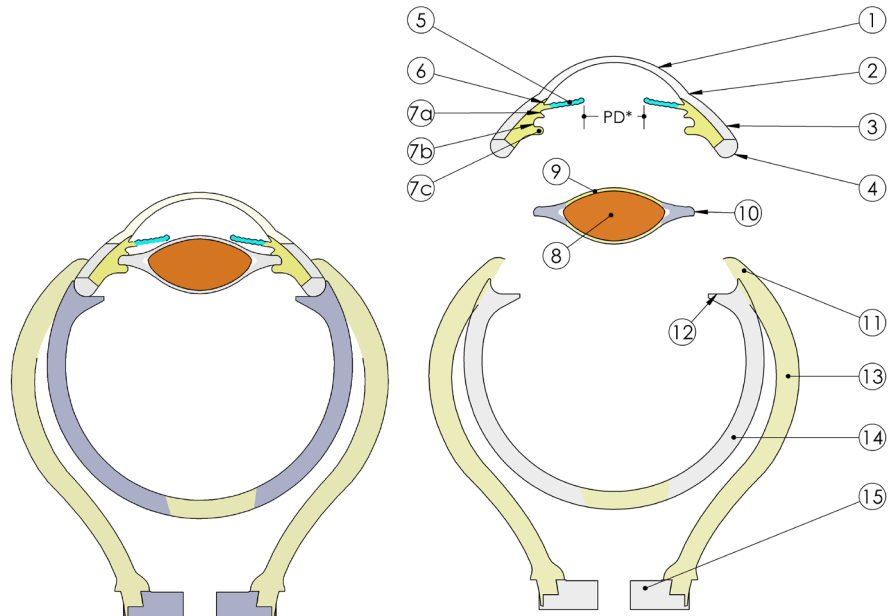
The OKULO lens can be removed to re-create aphakic conditions or to replace used lenses.

The OKULO Anterior Segment works with our Posterior Segment Adapter and FLEX-ORBIT to provide the most realistic surgical simulation experience.



Pat. Pending

- 1 - CORNEA
- 2 - LIMBUS
- 3 - SCLERA
- 4 - SUPPORT RING
- 5 - IRIS
- 6 - ANGLE
- 7 - CILLIARY BODY (CB)
- 7A - CB SULCUS
- 7B - CB NOTCH
- 7C - CB PROCESSES
- 8 - LENS
- 9 - CAPSULE
- 10 - ATTACHMENT "ZONULE"
- 11 - MUSCLE INSERTION
- 12 - PLATFORM
- 13 - MUSCLE
- 14 - GLOBE
- 15 - BASE



## FEATURES AND BENEFITS

- Unique modular, customizable and configurable model
- Color structures and clear cornea
- Custom iris size and pigmentation
- Removable lens allows simulation of phakic and aphakic cases
- Sealed anterior chamber allows viso-elastic/fluid fill (allowing gonioscopy)
- Please inquire about our procedure specific configurations:  
gonioscopy, iris suturing, cataract surgery

# ORBIT

## Model



The **ORBIT** is the holder for all BIONIKO anterior segment models. It provides an anatomical frame of reference and adds realism to the surgical scenario by challenging the user to manipulate instruments according to the facial structures around the eye.

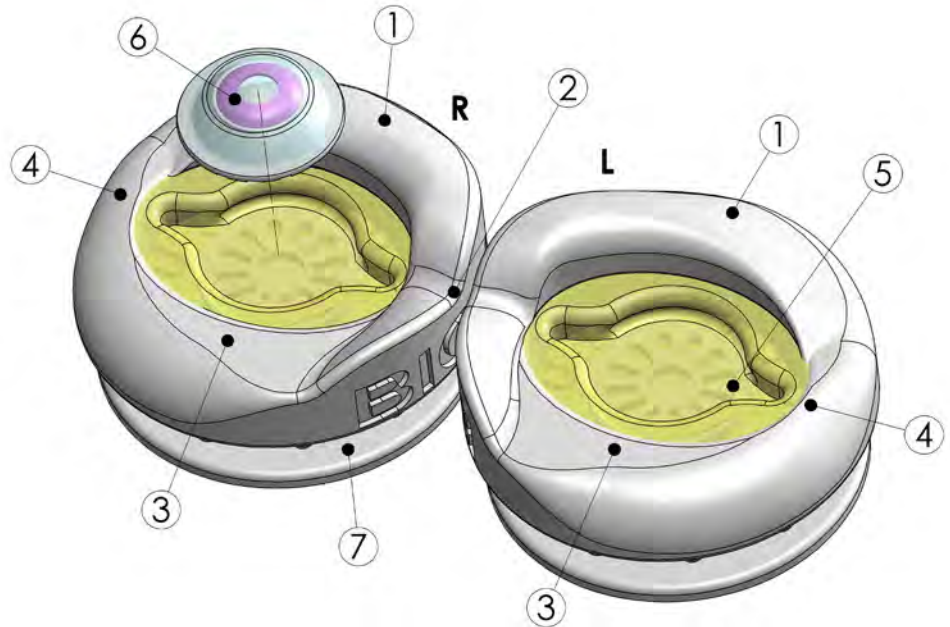
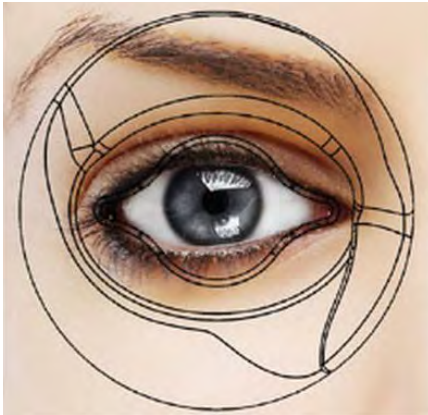


The **ORBIT** can be secured to any smooth surface (horizontal or vertical) with its integrated suction cup and will still retain a realistic degree of freedom that simulates head and eye movement.

There are right and left **ORBIT** models to practice all approaches: Right-Superior, Right-Temporal, Left-Superior and Left-Temporal

Pat. Pending

- 1 - BROW / SUPERIOR
- 2 - BRIDGE / NASAL
- 3 - ZYGOMATIC / INFERIOR
- 4 - TEMPORAL
- 5 - EYELID / SOCKET
- 6 - EYE MODEL
- 7 - SUCTION CUP



## FEATURES AND BENEFITS

- Provides anatomical frame of reference to anterior segment models
- Practice superior (1) or temporal (4) approaches on both left (L) and right (R) eyes
- Suction-cup firmly attaches to any smooth surface while retaining realistic movement
- Compact and portable design

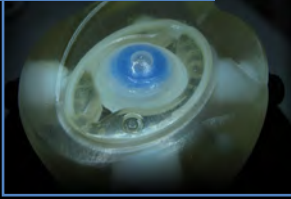


# FLEX-ORBIT

## Modular Training Platform



SOCKET ADAPTER



The **FLEX-ORBIT** modular training platform enhances and facilitates the use of ex-vivo and synthetic eye models for training and R&D purposes. It can position, secure and pressurize ex-vivo eyes of different sizes (18-26mm Ø), while providing the user with an anatomical frame of reference.

The **FLEX-ORBIT** is designed to receive and complement the entire line of BIONIKO synthetic models. Whole globe models like **OJOS** and **EXOS** fit right in. With the included socket adapter, the **FLEX-ORBIT** can receive all anterior segment models and task trainers, such as the **RHEXIS** and **KERATO**. This makes the **FLEX-ORBIT** a versatile tool for any surgical training program.

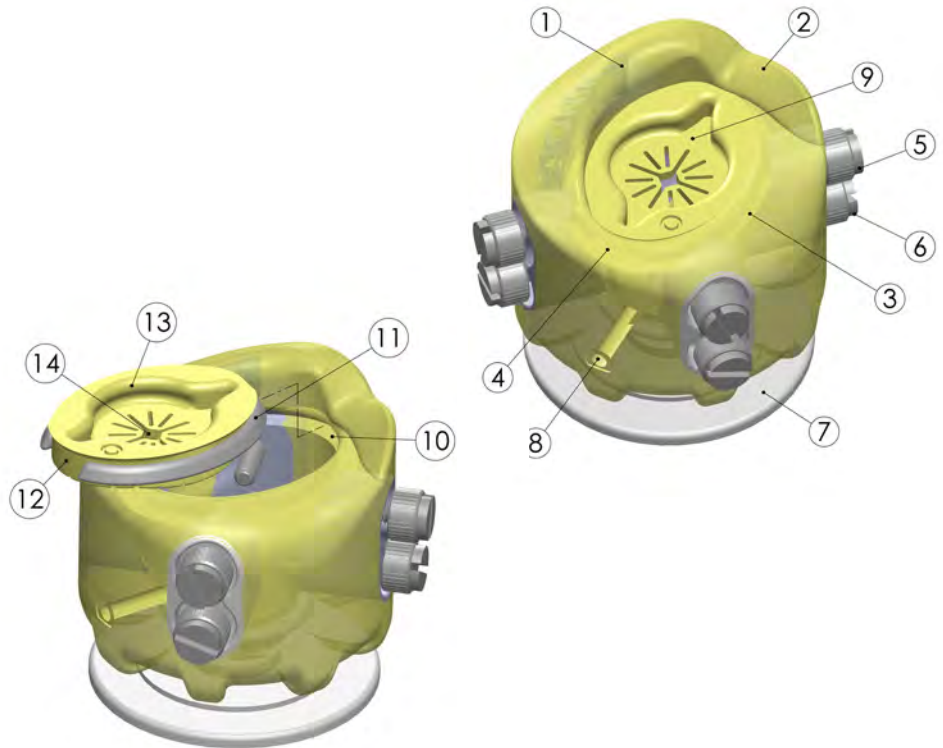
This compact platform is ideal for use in the classroom, research lab, wet-lab and even at the office to communicate with colleagues and patients.

Pat. Pending



# FLEX-ORBIT

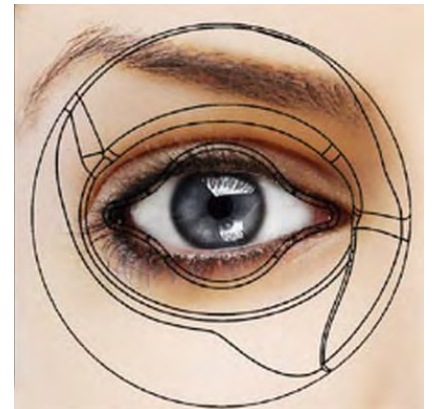
- 1 - SUPERIOR (BROW)
- 2 - NASAL (BRIDGE)
- 3 - INFERIOR
- 4 - TEMPORAL
- 5 - ANTERIOR SCREW
- 6 - POSTERIOR SCREW
- 7 - SUCTION CUP
- 8 - DRAIN/PORT
- 9 - SOCKET ADAPTER
- 10 - ADAPTER GROOVE
- 11 - SNAP RING
- 12 - SNAP RING GAP
- 13 - EYELID
- 14 - SOCKET BASE



## FEATURES AND BENEFITS

- Use with both synthetic and biological tissue models\*
- Adjust eye position with posterior screws (6)
- Adjust intra-ocular pressure with anterior screws (5)
- Suction-cup firmly attaches to any smooth surface
- Socket adapter for anterior segment models

\* For research use only



# EYE LIDS

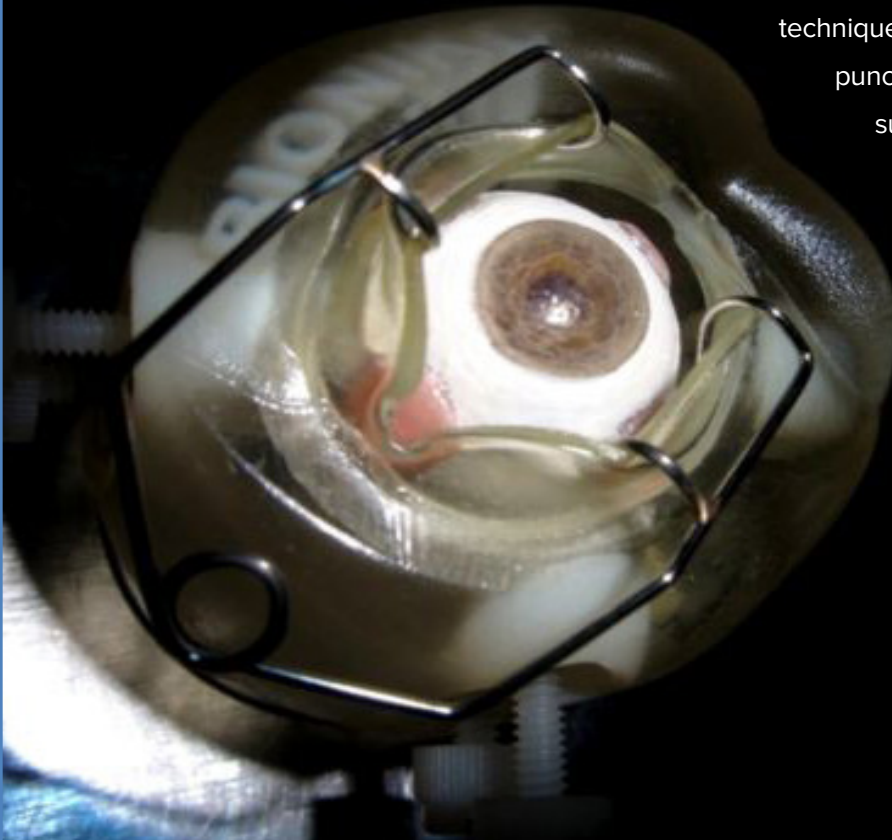
## FLEX-ORBIT Accessory



Add realism and difficulty to your simulation scenario by using the EYE LIDS FLEX-ORBIT accessory. The flexible EYE LIDS are detachable and easily inserted into the FLEX-ORBIT groove.

Use for demonstration, practice and assessment of techniques such as speculum placement and punctum plug placement. EYE LIDS features superior and inferior puncta (0.6mm).

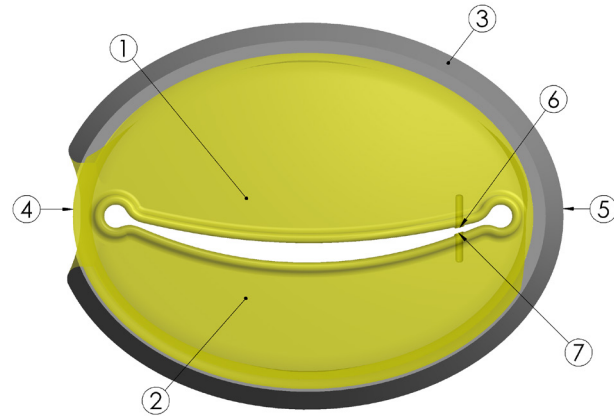
EYE LIDS can also be used as an introductory ocular trauma model. Eye lid laceration is not an everyday encounter for many ophthalmologists and EYE LIDS provides a basic platform for training and communication with peers and students.



Pat. Pending

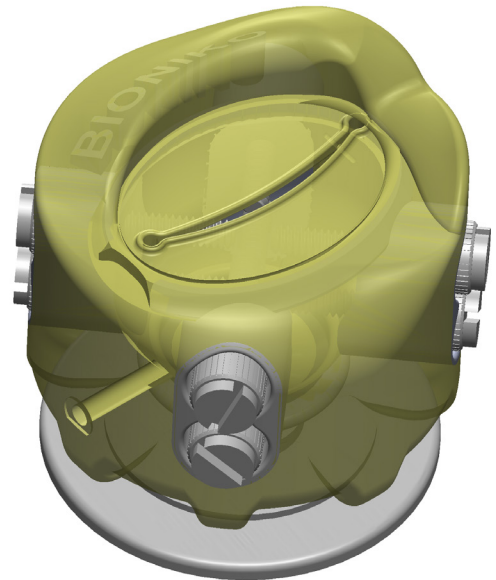
# EYE LIDS

- 1 - SUPERIOR LID
- 2 - INFERIOR LID
- 3 - SNAP RING
- 4 - SNAP RING GAP (TEMPORAL)
- 5 - SNAP RING APEX (NASAL)
- 6 - SUPERIOR LACRIMAL PUNCTUM (0.6 MM)
- 7 - INFERIOR LACRIMAL PUNCTUM (0.6 MM)



## FEATURES AND BENEFITS

- Add further realism to your training scenario
- Demonstrate speculum insertion
- Demonstrate lacrimal punctum dilation and occlusion
- Simulate eye lid trauma and suturing techniques



# CORDELIA

## Recovery Simulator



The **CORDELIA** recovery simulator is based on an in-situ excision scenario. Eye bank technicians must master this technique to successfully recover delicate corneal tissue from donors in the field.

**CORDELIA** is a task trainer that allows users to learn and practice the tissue recovery technique without using valuable donor tissue, in a realistic yet simple manner. Its repeatability and availability makes it ideal for developing standardized methods of instruction and assessment.

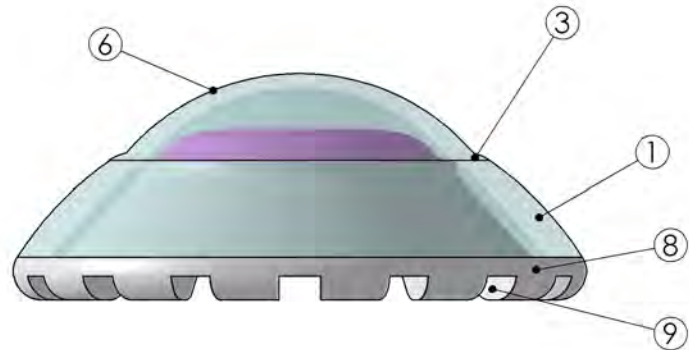
The **ORBIT** (Sold separately) serves a holder for the **CORDELIA** models and provides support, frame of reference and the challenges posed by facial features surrounding the eye.

The CORDELIA recovery model was made possible by the valuable guidance and support of LIONS Vision Gift

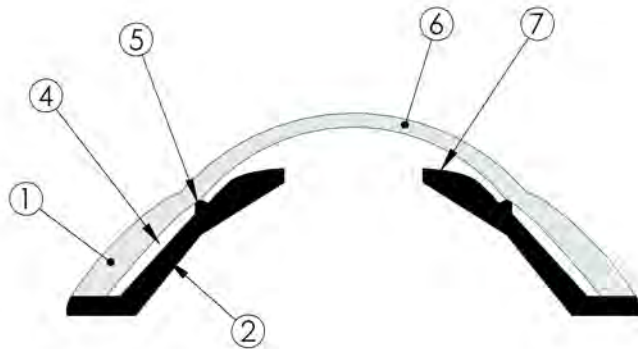
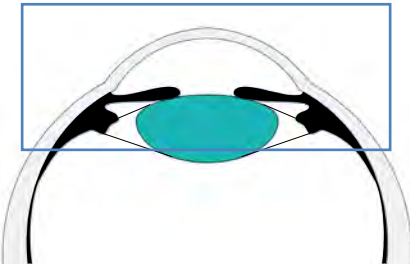


# CORDELIA

- 1 - SCLERAL LAYER
- 2 - CHOROID LAYER
- 3 - LIMBUS
- 4 - SUPRA-CHOROIDAL SPACE
- 5 - SPUR
- 6 - CORNEA
- 7 - IRIS
- 8 - STRUCTURAL RING
- 9 - NOTCH



DETAIL VIEW



## FEATURES AND BENEFITS

- Practice corneal detachment technique
- Refine sequence and manipulation of surgical instruments
- Decrease reliance on donor tissue for training
- Available on demand
- Standardize your instruction and assessment around a consistent model



# EXOS

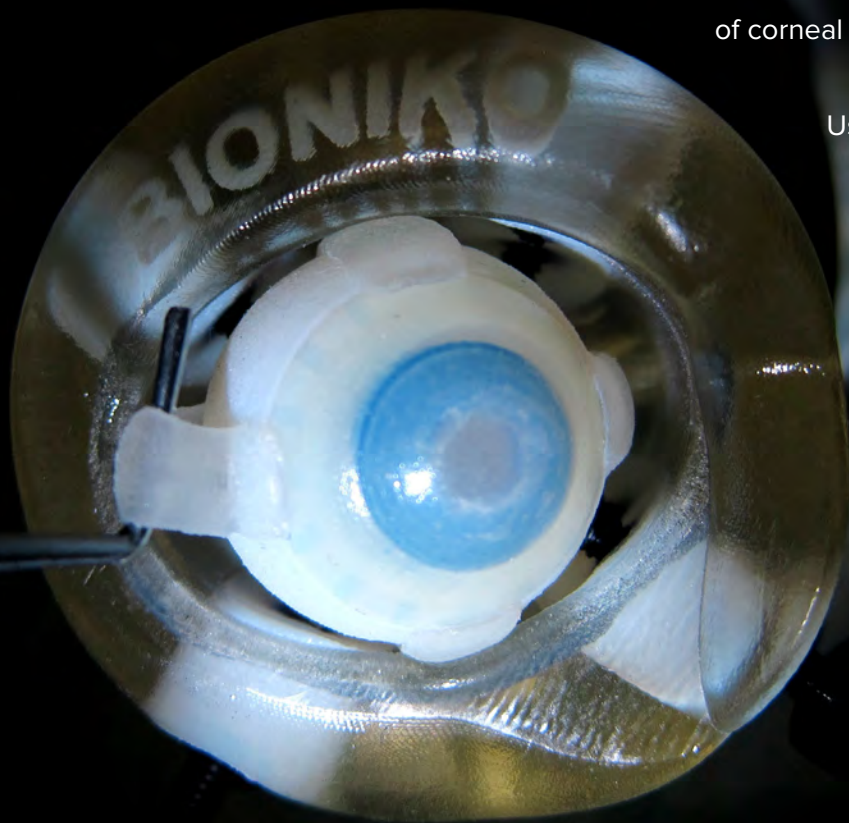
## Enucleation Simulator



The **EXOS** model focuses on simulating the challenging steps of an enucleation and corneal excision procedures. Learning to hook and transect the muscles and optic nerve is a fundamental skill for eye-bank technicians. The **EXOS** is coupled to our **CORDELIA** recovery simulator, allowing the practice of corneal excision with greater realism.

Users can demonstrate and practice the sequence and manipulation of surgical instruments around anatomical landmarks. The **EXOS** model serves as a tool for introductory instruction and competency reviews.

The **FLEX-ORBIT** (Sold separately) serves as a holder for the **EXOS** model and provides reference and realism by challenging the user to manipulate instruments according to the orbit cavity and facial structures around the eye.

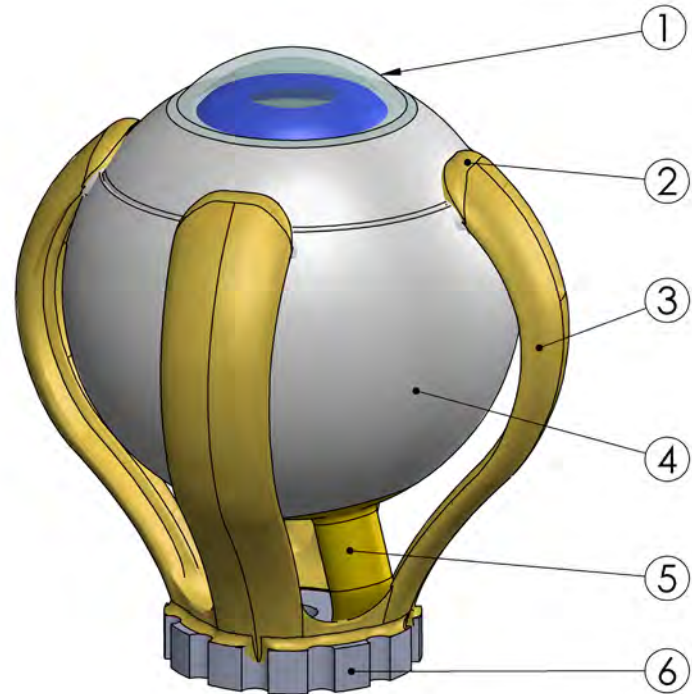
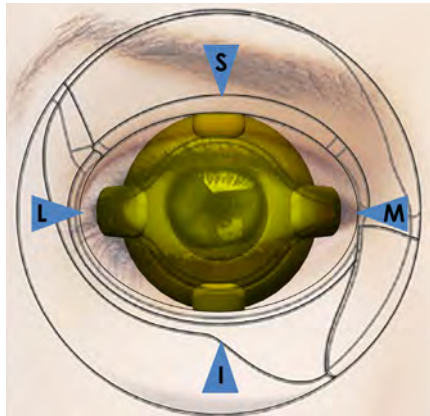


The EXOS Enucleation Simulator was made possible by the valuable guidance and support of Florida Lions Eye Bank



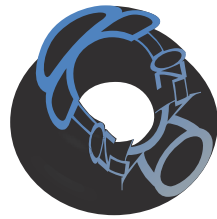


- 1 - CORDELIA MODEL
- 2 - MUSCLE INSERTION
- 3 - RECTUS MUSCLE
- 4 - GLOBE
- 5 - OPTIC NERVE
- 6 - BASE



## FEATURES AND BENEFITS

- Realistic muscle traction and feel
- Practice enucleation and excision in one model
- Practice sequence and manipulation of surgical instruments
- Decrease reliance on donor tissue for training
- Available on demand
- Standardize your instruction and assessment around a consistent model



BIONIKO  
**MODELS**

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[www.youtube.com/user/BionikoDesign](http://www.youtube.com/user/BionikoDesign)

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