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
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.

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FEATURES AND BENEFITS

- Accurate tissue proportions
- Realistic tissue feel
- Repeatable and available
- Encourages awareness of tissue hydration
- Practice microsuturing techniques (continuous/interrupted)
- Improve confidence and decrease fatigue
- Improve time to completion (Decrease OR time)
- Self assess execution by checking for:
  - Suture radiality
  - Safe and even distance to tissue edge
  - Knot tension
  - Even spacing between sutures
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.
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
Assess instrument control by checking wound integrity
Assess execution by measuring rhexis size and centration
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

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

- 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
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.

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• 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
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.
• “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
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.
**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
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.
**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