Transorbital

Anatomex 3D Transorbital Surgical Simulation Model

INSTRUCTION MANUAL

PUBLIC EDITION





ANATOMEX 3D

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About this manual

This public edition of the instruction manual is intended for surgeons, trainees, simulation facilitators, course directors and procurement teams evaluating the Anatomex 3D Transorbital Surgical Simulation Model. It introduces the model and its components, outlines training applications for transorbital neuroendoscopic surgery (TONES), including the superior eyelid approach and transorbital access to the lateral sphenoid recess, and explains how to care for the model between training sessions.

The full Instruction Manual, including detailed segment anatomy, segment exchange instructions and the model's CT and MRI datasets, is supplied to customers with each kit.

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1. Model overview and components

The Anatomex 3D Transorbital Surgical Simulation Model is a life-size, modular model for hands-on training in transorbital neuroendoscopic surgery (TONES). A cranium with a removable soft-tissue covering accepts interchangeable orbital segments: replaceable surgical segments made of skin, orbital fat, temporalis muscle, drillable bone and skull base structures, and clear orbits for anatomical teaching. Surgeons can practise endoscopic approaches through the orbit to the middle cranial fossa, cavernous sinus region and sphenoid sinus, including access, reconstruction and defect repair, in a cadaver-free setting.

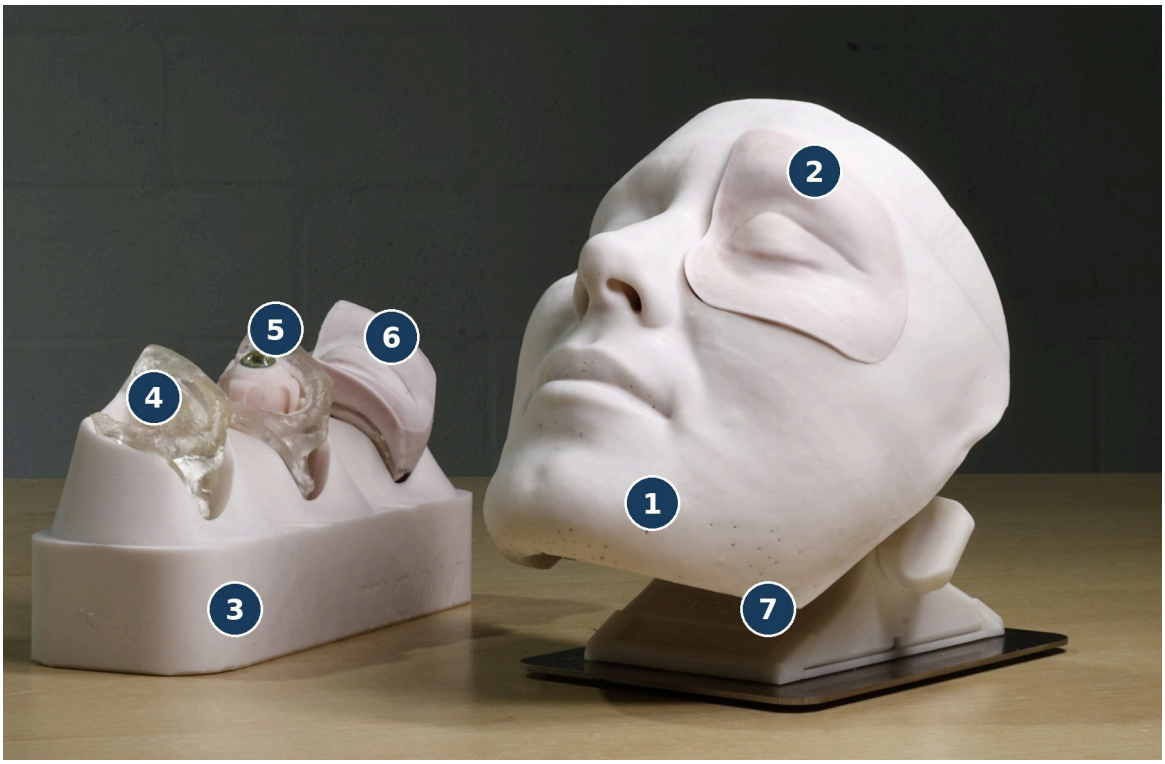


Fig. 1 — Transorbital model with segment holder and orbital components

No.	Component
1	Cranium with soft-tissue (facial skin) covering
2	Surgical orbital segment, seated in the orbital window
3	Segment holder
4	Clear orbit
5	Clear full orbit with globe and orbital soft tissue
6	Spare surgical orbital segment
7	Rotatable mount

1.1 Component reference table

The table below describes each component of the transorbital model.

Component	Description
Cranium with soft-tissue covering	The life-size cranium forms the base structure into which the orbital segments fit. Its removable facial skin covering gives realistic surface anatomy and can be removed to demonstrate the bony anatomy of the skull.
Surgical orbital segments (×4)	Replaceable segments for hands-on surgical simulation, containing skin, periorbita and orbital fat, temporalis muscle, drillable bone, dura, cavernous sinus, internal carotid artery and cranial nerves. Each kit contains two segments with normal sphenoid pneumatisation and two well-pneumatised segments with a Sternberg canal (lateral sphenoid) configuration.
Clear orbit — normal sphenoid	A transparent orbit showing normal sphenoid sinus anatomy, in which the sphenoid sinus does not pneumatise into the greater wing.
Clear orbit — well-pneumatised sphenoid	A transparent orbit showing a sphenoid sinus pneumatised into the greater wing of the sphenoid (lateral orbital wall), for teaching the anatomy relevant to Sternberg canal defects.
Clear full orbit with soft tissue	A transparent orbit containing the globe, extraocular (rectus and oblique) muscles and orbital nerves, for demonstrating orbital anatomy.
Locking pin	Secures the surgical orbital segment in the cranium so that it does not dislodge under instrument force, for example from a Kerrison punch.
Rotatable mount	Holds the cranium and rotates to position the head at the optimal angle for the surgical approach or anatomical study.
A4 tray with removable silastic rim	A stabilising A4 tray for surgical simulation. The removable silastic rim catches irrigation run-off when drilling with water and stops the model slipping.
DICOM CT and MRI images	CT and MRI DICOM datasets of the model, supplied to customers with the kit, for navigation registration and imaging correlation.
Navigation reference sticker	A sticker on the forehead to which an image-guided navigation reference point can be applied.
Segment holders (×2)	Hold the orbital segments and clear orbits when not in use and during transport.
Padded carry bag	A custom carry bag, with padded sides for protection, that holds the complete kit.

1.2 Included in the box

Included in the box

- 1 × cranium with soft-tissue covering
- 1 × rotatable mount
- 1 × white A4 tray with removable silastic rim
- 4 × surgical orbital segments (2 × normal sphenoid, 2 × well-pneumatised / Sternberg canal), one pre-inserted and secured with the locking pin
- 1 × clear orbit with normal sphenoid sinus
- 1 × clear orbit with well-pneumatised sphenoid sinus
- 1 × clear full orbit with globe, extraocular muscles and nerves
- 1 × locking pin (pre-installed)
- 1 × navigation reference sticker (forehead)
- DICOM CT and MRI images of the model
- 2 × segment holders
- 1 × padded carry bag

Sold separately

The orbital retractor set (8 mm, 12 mm and 16 mm stainless steel retractors, 20 cm long) is not included in the kit and can be ordered separately. See Section 5.4.

Instrument and technology compatibility

The model is designed for use with rigid endoscopes (0°, 30° and 45°), high-speed drills with irrigation, Kerrison punches, dissectors, suction and orbital retractors, as used in transorbital endoscopic surgery. It is also suitable for demonstrating image-guided navigation systems.

2. The surgical orbital segment

The surgical orbital segment reproduces, in a single replaceable unit, every layer encountered during a transorbital approach, from the eyelid skin to the dura of the middle cranial fossa and the structures of the cavernous sinus region. Each structure has a distinct colour and tactile character, so trainees can identify it endoscopically and handle it as they would in surgery. The bone has authentic drilling resistance.

- Eyelid skin and orbicularis oculi, including the upper eyelid crease
- Periorbita and orbital fat
- Lateral orbital wall and greater and lesser sphenoid wings, drillable with irrigation
- Temporalis muscle in the temporal fossa
- Dura of the middle cranial fossa
- Cavernous sinus and internal carotid artery
- Optic nerve and cranial nerves III–VI in relation to the orbital fissures

Each kit includes segments with normal sphenoid pneumatisation and well-pneumatised segments with a Sternberg canal (lateral sphenoid) configuration, for practising transorbital repair of lateral sphenoid defects.

3. Interchangeable clear orbits

Three clear orbits are supplied for anatomical teaching. They interchange with the surgical segments, so trainees can study the bony and soft-tissue anatomy before and after a simulated procedure.

3.1 Clear orbits — normal and well-pneumatised



Fig. 2 — Clear orbit, normal sphenoid

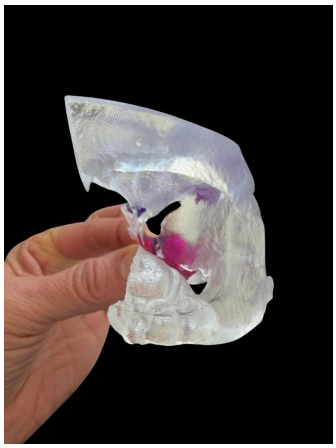


Fig. 3 — Clear orbit, well-pneumatised sphenoid (pink)

Clear orbit	Anatomy demonstrated
Normal sphenoid	The lateral orbital wall is clear. The sphenoid sinus does not pneumatise into the greater wing of the sphenoid.
Well-pneumatised sphenoid	The sphenoid sinus (pink) pneumatises into the lateral wall of the orbit (greater wing of the sphenoid), showing the anatomy relevant to transorbital access to Sternberg canal defects.

3.2 Clear full orbit with soft tissue

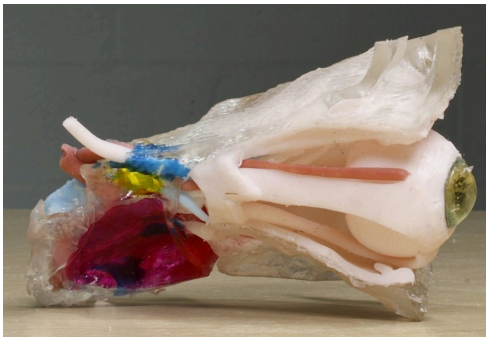


Fig. 4 — Clear full orbit, lateral view



Fig. 5 — Clear full orbit, oblique view

The clear full orbit contains a globe, the rectus and oblique extraocular muscles, and the nerves within the orbit. It shows the relationships between the orbital contents, the orbital apex, and the superior and inferior orbital fissures, which helps trainees understand what is being protected and retracted during a transorbital approach.

4. Clinical training and demonstration applications

The transorbital model supports hands-on training in endoscopic transorbital approaches to the orbit and skull base, through the superior eyelid and lateral transorbital corridors. The replaceable surgical segments allow full procedures, including drilling, to be practised repeatedly, while the clear orbits support anatomical teaching before and after dissection.

4.1 Setting up for surgical simulation

1. Place the mount and cranium in the A4 tray.
2. Fit the removable silastic rim if you will be drilling with water irrigation.
3. Make sure the surgical orbital segment is fully seated and the locking pin is inserted.
4. Rotate the head on its mount to the angle needed for the planned approach.
5. Connect the endoscope, camera, light source, drill and suction according to their manufacturers' instructions.

4.2 Superior eyelid transorbital approach

Preparation and technique

1. Make a skin incision in the upper eyelid crease, extending laterally towards the lateral orbital rim.
2. Dissect down to the lateral orbital rim and incise the periosteum.
3. Elevate the periorbita from the lateral orbital wall, keeping the orbital contents within the periorbita, towards the superior and inferior orbital fissures.
4. Protect and retract the orbital contents with an orbital retractor, and introduce a rigid endoscope.
5. Drill the greater wing of the sphenoid between the superior and inferior orbital fissures, with irrigation, to expose the temporalis muscle laterally and the dura of the middle cranial fossa.
6. Continue the exposure as required, identifying the anterior clinoid process and the relationships of the cavernous sinus, internal carotid artery and cranial nerves III–VI.
7. Withdraw the instruments carefully on completion.

Teaching and demonstration applications

The segment lets trainees practise the complete transorbital corridor, from incision to the middle cranial fossa: soft-tissue dissection, retraction of the orbital contents, endoscope handling in a narrow corridor, and controlled drilling of the greater wing near critical structures.

> **Tip — Wet the lateral orbital bone during drilling**
>
> Irrigate the lateral orbital wall and greater wing with water or saline while drilling. This keeps the drilling field clear, controls bone dust and reproduces the irrigated drilling used in surgery. Fit the silastic rim to the tray to catch the run-off.

4.3 Transorbital access to the lateral sphenoid recess

The well-pneumatised segments, in which the sphenoid sinus extends into the greater wing, are designed for practising transorbital access to the lateral recess of the sphenoid sinus, as used to repair Sternberg canal defects.

Preparation and technique

1. Insert a well-pneumatised surgical segment and secure it with the locking pin.
2. Perform the transorbital approach and expose the greater wing of the sphenoid as described in Section 4.2.
3. Drill through the greater wing to enter the pneumatised lateral recess of the sphenoid sinus.
4. Demonstrate localisation of the defect and the reconstruction technique.

4.4 Image-guided navigation

A navigation reference sticker on the forehead provides a fixed site for an image-guided navigation reference point. CT and MRI DICOM images of the model are supplied with the kit for registration, so the model can be used to demonstrate registration, instrument tracking and navigated transorbital approaches.

4.5 Anatomical teaching

Use the clear orbits (Section 3) to demonstrate the bony orbit, the orbital fissures, the optic canal and the surrounding skull base anatomy, and to compare normal with well-pneumatised sphenoid anatomy. The clear full orbit shows the globe, extraocular muscles and nerves. Removing the facial skin covering shows the bony anatomy of the skull.

> **Tip — Before and after dissection**
>
> Show trainees the matching clear orbit before they operate on a surgical segment, then compare it with the dissected segment afterwards. This reinforces the 3D relationships between the endoscopic view and the underlying anatomy.

5. Care and maintenance

Proper care keeps the transorbital model performing consistently across training sessions. The surgical orbital segments are consumable: once drilled and dissected, a segment is replaced. The cranium, soft-tissue covering, clear orbits and accessories are reusable.

5.1 After each training session

- Remove all endoscopes, retractors, drills and other instruments. Clean and maintain reusable instruments separately, according to their manufacturers' instructions.
- Remove the used surgical segment and clear any bone dust and debris from the model.
- Empty and rinse the A4 tray and silastic rim after irrigation, and dry them thoroughly.
- Wipe the cranium and soft-tissue covering with a damp cloth or an alcohol swab, and allow them to dry.
- Wipe the clear orbits with warm soapy water or an alcohol swab, and return all segments to their holders.
- Check that the locking pin is present and the mount rotates freely.

5.2 Cleaning agents

Use only cleaning products compatible with the component materials. Avoid prolonged exposure to alcohol or harsh chemicals.

Agent	Cranium, mount and tray	Skin covering and segments
Mild soap + warm water	✓ Safe	✓ Safe
Isopropyl alcohol (70%) / alcohol swab	✓ Safe	⚠ Brief wipe only
Bleach / chlorine solutions	× Not recommended	× Avoid
Acetone / solvent-based cleaners	× Avoid	× Avoid — will damage the material
Autoclave / steam sterilisation	× Not suitable	× Not suitable

5.3 Storage and transport

- Store the cranium, tray and segments in the padded carry bag when not in use, and carry the bag upright.
- Return all orbital segments and clear orbits to their segment holders for storage and transport.
- Keep the model away from direct sunlight and extreme temperatures (recommended storage: 10–30 °C).
- Do not place heavy objects on the model or the soft-tissue covering during storage.
- Store the locking pin in the bag with the model.



Fig. 6 — The complete kit packed in its carry bag

5.4 Replacement parts and accessories

Item	Description
Surgical simulation orbital segments	Replacement surgical segments are available in packs of three.
Clear orbits	Each clear orbit is available individually.
Orbital retractor set	Three reusable stainless steel orbital retractors (8 mm, 12 mm and 16 mm, each 20 cm long), designed to complement the transorbital model. Sold separately.
Padded carry bag	Custom carry bag for the full kit.

Technical support and full manual

For questions about the transorbital model, to order replacement segments and accessories, or for a copy of the full Instruction Manual as an existing customer, please contact Anatomex 3D customer support.
Email: info@anatomex3d.com
Website: www.anatomex3d.com

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Anatomical simulation models for surgical training and device demonstration

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