Implantable Miniaturized Telescope (IMT)

**Background**
The IMT was first approved by the FDA in 2010. 6 years later, 500 patients have had this device implanted in their better seeing eye.

**Technical Specification of the IMT**
- Magnification – 2.7x (magnification benefit for a given patient is unknown)
- Field of view – 24 degrees
- Retinal illumination – 40% transmission (60% reduced brightness)

**Testing Protocol**
- Patients must be 65 years of age or older.
- To qualify for consideration with an IMT, the patient must be phakic in the eye being considered for the IMT.
- The patient is first evaluated by a retina specialist who confirms end stage macular disease with no CNVM.
- Visual acuity must be between 20/160 and 20/800 in the eye to be implanted.
- The patient is next seen by vision rehabilitation where they must see at least 1 line better on an ETDRS chart with the external telescope simulator. The expected improvement is 2.3x which is equal to 3-4 lines of improvement.
- The patient is next seen by a cornea specialist for an endothelial cell count and anterior chamber depth assessment.
- If the patient meets all the aforementioned criteria and is interested in pursuing the IMT, they are next seen by an occupational therapist for a pre-implantation assessment.
- The patient is made aware that they will be required to work weekly with an OT for 2-4 months, post-implantation.
  - The patient will have their first post implantation evaluation by the OT to look at ambulation skills 2 weeks post implant.

**Implantation Information**
- IMT is implanted in the bag following a 12mm limbal incision and a 7mm capsulorhexis.

**After Implantation**
- There is a great deal of inflammation and the patient will be on steroids (Q1-2 hours) and dilating drops for 2 to 3 weeks.
- There will often be a great deal of astigmatism post implantation.

**Additional Information**
- Patients will not be able to drive with the IMT, because the field of view is only 24 degrees with this device.
Patients will still need to use devices for best visual functioning, particularly to do any type of reading.

Only about 20% of people interested in the IMT prove to be good candidates.

**Contraindications:**

Implantation of the IMT is contraindicated in patients:

- With Stargardt macular dystrophy.
- With central anterior chamber depth (ACD) < 3.0 mm; measurement of the ACD should be taken from the posterior surface of the cornea (endothelium) to the anterior surface of the crystalline lens.
- With the presence of corneal guttata.
- Who do not meet the minimum age and endothelial cell density
  - Requirements (age 65 to < 70 min. cell density ≥ 2300 cells/mm2; age 70 to < 75 min. cell density ≥ 2000 cells/mm2; age 75 or greater min. cell density ≥ 1800 cells/mm2)
- With cognitive impairment that would interfere with the ability to understand and complete the Acceptance of Risk and Informed Decision Agreement or prevent proper visual training/rehabilitation with the device.
- Who have evidence of active CNV on fluorescein angiography or treatment for CNV within the past six months.
- With any ophthalmic pathology that compromises the patient’s peripheral vision in the fellow eye.
- With previous intraocular or cornea surgery of any kind in the operative eye, including any type of surgery for either refractive or therapeutic purposes.
- Who have prior or expected ophthalmic related surgery within 30 days preceding intraocular telescope implantation.
- With a history of steroid-responsive rise in intraocular pressure, uncontrolled glaucoma, or preoperative IOP > 22 mm Hg, while on maximum medication.
- With known sensitivity to post-operative medications.
- Who have a history of eye rubbing or an ocular condition that predisposes them to eye rubbing.

Additionally, the potentially operative eye cannot have:

- Myopia > 6.0 D
- Hyperopia > 4.0 D
- Axial length < 21 mm
- A narrow angle, i.e., < Schaffer grade 2
- Cornea stromal or endothelial dystrophies, including guttata
- Inflammatory ocular disease
The IMT was first approved by the FDA in 2010. 6 years later, 500 patients have had this device implanted in their better seeing eye.

Technical Specification of the IMT

- Magnification – 2.7x (magnification benefit for a given patient is unknown)
- Field of view – 24 degrees
- Retinal illumination – 40% transmission (60% reduced brightness)

Testing Protocol

- Patients must be 65 years of age or older.
- To qualify for consideration with an IMT, the patient must be phakic in the eye being considered for the IMT.
- The patient is first evaluated by a retina specialist who confirms end stage macular disease with no CNVM.
- Visual acuity must be between 20/160 and 20/800 in the eye to be implanted.
- The patient is next seen by vision rehabilitation where they must see at least 1 line better on an ETDRS chart with the external telescope simulator. The expected improvement is 2.3x which is equal to 3-4 lines of improvement.
- The patient is next seen by a cornea specialist for an endothelial cell count and anterior chamber depth assessment.
- If the patient meets all the aforementioned criteria and is interested in pursuing the IMT, they are next seen by an occupational therapist for a pre-implantation assessment.
- The patient is made aware that they will be required to work weekly with an OT for 2-4 months, post-implantation.
- The patient will have their first post implantation evaluation by the OT to look at ambulation skills 2 weeks post implant.

Implantation Information

- IMT is implanted in the bag following a 12mm limbal incision and a 7mm capsulorhexis.

After Implantation

- There is a great deal of inflammation and the patient will be on steroids (Q1-2 hours) and dilating drops for 2 to 3 weeks.
- There will often be a great deal of astigmatism post implantation.

Additional Information

- Patients will not be able to drive with the IMT, because the field of view is only 24 degrees with this device.
- Patients will still need to use devices for best visual functioning, particularly to do any type of reading.
- Only about 20% of people interested in the IMT prove to be good candidates.

Contraindications:

- Implantation of the IMT is contraindicated in patients:
  - With Stargardt macular dystrophy.
  - With central anterior chamber depth (ACD) < 3.0 mm; measurement of the ACD should be taken from the posterior surface of the cornea (endothelium) to the anterior surface of the crystalline lens.
  - With the presence of corneal guttata.
  - Who do not meet the minimum age and endothelial cell density requirements (age 65 to < 70 min. cell density ≥ 2300 cells/mm²; age 70 to < 75 min. cell density ≥ 2000 cells/mm²; age 75 or greater min. cell density ≥ 1800 cells/mm²)
  - With cognitive impairment that would interfere with the ability to understand and complete the Acceptance of Risk and Informed Decision Agreement or prevent proper visual training/rehabilitation with the device.
  - Who have evidence of active CNV on fluorescein angiography or treatment for CNV within the past six months.
  - With any ophthalmic pathology that compromises the patient’s peripheral vision in the fellow eye.
  - With previous intraocular or cornea surgery of any kind in the operative eye, including any type of surgery for either refractive or therapeutic purposes.
  - Who have prior or expected ophthalmic related surgery within 30 days preceding intraocular telescope implantation.
  - With a history of steroid-responsive rise in intraocular pressure, uncontrolled glaucoma, or preoperative IOP > 22 mm Hg, while on maximum medication.
  - With known sensitivity to post-operative medications.
  - Who have a history of eye rubbing or an ocular condition that predisposes them to eye rubbing.
- Additionally, the potentially operative eye cannot have:
  - Myopia > 6.0 D
  - Hyperopia > 4.0 D
  - Axial length < 21 mm
  - A narrow angle, i.e., < Schaffer grade 2
  - Cornea stromal or endothelial dystrophies, including guttata
  - Inflammatory ocular disease
  - Zonular weakness/instability of crystalline lens, or pseudoexfoliation
  - Diabetic retinopathy, untreated retinal tears, retinal vascular disease, history of retinal detachment, retinitis pigmentosa, intraocular tumor or optic nerve disease

- Finally, in eyes in which both haptics cannot be placed within the capsular bag during surgery, the intraocular telescope should be removed and replaced with a conventional intraocular lens (IOL); sulcus fixation of either one or both haptics increases the risk of severe endothelial cell loss and corneal transplant.

Patients who are interested in the IMT, should first have a vision rehabilitation evaluation with Drs. Shahid or Wilkinson. During that evaluation, the IMT will be demonstrated along with other vision rehabilitation devices and strategies they will benefit from.