



OBJECTIVE

An improved glaucoma implant for regulating excessive fluid pressure within the eye

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Background

Glaucoma is the second highest cause of blindness worldwide

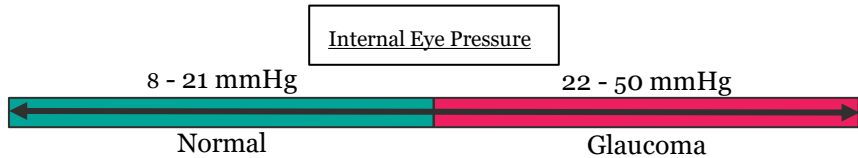
Affecting over **65 million** people, **glaucoma** is a disease that causes excessive **fluid buildup** within the eye. Over time, increased pressure inside the eye **damages** the optic nerve and **impairs vision**. While **no cure exists**, several treatment options are used, including medication, laser treatment and **surgery**.

Tube Shunt Surgery is an effective treatment for severe glaucoma

In severe cases, surgeons will **lower** eye pressure by **redirecting** fluid into a **tube shunt implant**. Fluid from the eye will **drain** into a tube and collect onto the plate sutured to the back of the eye, where it is **reabsorbed** by the body. Although these devices can initially lower eye pressure, they have a higher rate of **failure** over time.

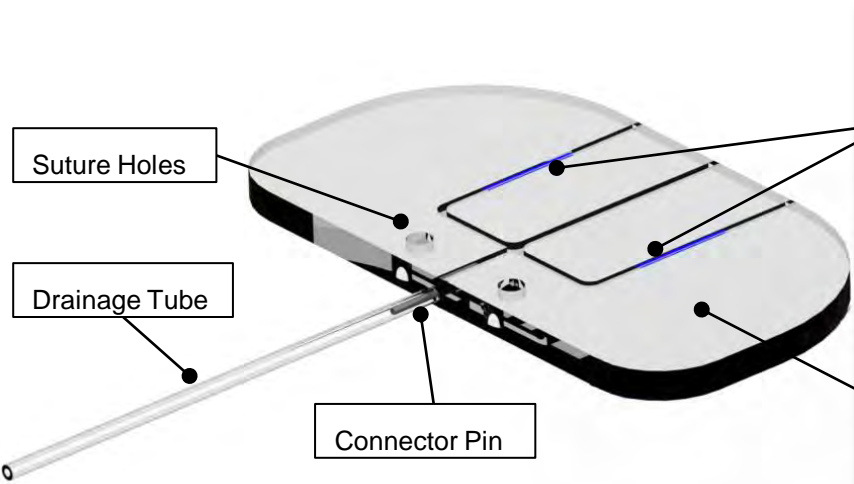
Conventional tube shunt devices have several limitations

- Existing devices are unable to account for the **varying resistance** to fluid flow before and after **scar formation**, the body's immunological response to an implant.
- Commonly used implants cost up to **\$1,000** each.
- Each device includes only **two sizes** for all patients.



Design Solution

The I-OPener Tube Shunt is a low-cost (~\$20), patient-specific device which accurately regulates intraocular pressure (IOP) using two degradable blockers encased within a microfluidic chamber.



Degradable Blockers:

- Gradually dissolve over time, increasing fluid flow and counteracting resistance created through scar formation
- Polymer concentration and length can be modified, altering the degradation rate to match each patient's initial pressure

Microfluidic Chamber:

- Multiple channels allow for improved pressure control
- Silicone material is affordable, biocompatible, and easy to manufacture