FluidVision
Accommodating IOL

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Mechanisms of Accommodation

- **Human accommodation**\(^1\)
  - Curvature change to the front & back lens surfaces
  - Negligible forward movement

- **Axial movement of the lens is inefficient to produce large accommodative amplitude**
  - Reports indicate potential for 2.5D power change for 1mm of movement\(^2,3\)
  - No accommodative reserve

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\(^1\) Glasser, Opth Clin N Am, 2006
\(^2\) Langebucher, Opth Phys Opt, 2004
\(^3\) Mcleod, J Cat Ref Surg, 2007
Potential of Optic Shape Change

- High accommodative amplitudes due to lens curvature changes
- 10D change possible
  - 20D lens with spherical optics
  - Refractive index – 1.48
  - 6mm lens diameter
  - Sag change of .3mm
- Using aspheric optics and a smaller accommodated OZ provide greater power change potential
Design Specs

- Normal cataract procedure
- Placed into capsular bag
- Sutureless incision
- Accommodative movement driven by ciliary muscle forces acting through the zonules to the capsular bag
- Provide 5-10D of accommodation
- Long lifetime
The FluidVision Lens Concept
The FluidVision Lens Concept

U.S. Patent No. 7122053, 7247168, 7261737

US Patents: 7122053, 7247168, 7261737
Materials

- Acrylic – Proprietary hydrophobic formulation, developed in-house
- Silicone fluid – similar to retinal tamponade fluids
- Matching the index of refraction for the two materials creates one optic element
Design Tools

- Solid modeling
- Finite element modeling
- Optical modeling
Preclinical Testing

- Bench top studies
  - Mechanical response
  - Optics
- Cadaver eye
  - Placement & fit
  - Response
Safety Studies

- Rabbit implant - Investigate capsular reaction
  - Well tolerated
  - Inflammatory response and PCO scores comparable to or favorable over commercial 3 pc acrylic

- Biocompatibility

- Sterilization validation
Feasibility Clinical Trial Design

- **Purpose:** to demonstrate the FluidVision AIOL is able to change its optic power in response to the accommodative forces of the eye
- **Inclusion:** end stage glaucoma & BCVA hand movement or worse
- **Duration:** performance testing for 1 month, safety F/U 6 months
- **Test method**
  - Pilocarpine to induce accommodation
  - Lens imaging by Visante AC OCT
Clinical Results

- N=5
- Lenses well tolerated
- Maintain good centration
- Accommodative movement observed in all patients
- Movement correlates to 5-8D
Conclusions from study

- Accommodative forces in the eye are capable of producing significant optic power change in the FluidVision Lens.
Next steps

- Performance optimization & repeatability
- Optical performance qualification
- Initial clinical studies in sighted eyes