



FUTURE
of Cataract Surgery



cataract

[kat-uh-rakt]

1. 285 Million¹ people are visually impaired worldwide

2. 19.34 Million² people are needlessly blind due to Cataracts

3. 10 Million² cataract surgeries performed each year

4. 10 Minutes³ is the average surgery time

[19,3

Over 19.34 million people are needlessly blind due to cataracts. Cataracts cannot be prevented, but they can be cured with one of the simplest and safest surgeries.²

Cataract Surgery was not always the safest surgery! In 600 BC, cataracts were treated with a technique called couching. The eye would be struck with a blunt object to force the zonules to break, and the lens would dislocate into the vitreous cavity. This restored limited unfocused vision.⁴

In 1747, Jacques Daviel, performed Extra Capsular Cataract Extraction. Dr. Daviel made an incision through the inferior cornea and enlarged it with scissors. The cornea was elevated, the lens capsule incised, the nucleus expressed, and the cortex removed by curettage. The head was immobilized by sand bags while the patient healed. The mortality rate was second to pulmonary emboli.⁵

340,000]

Intra Capsular Cataract Extraction (ICCE) quickly replaced ECCE in 1753, by removing lens and the thin capsule that surrounds the lens with a large incision. In 1967, Charles Kelman developed Phacoemulsification (the internal lens is emulsified with an ultrasonic hand piece and aspirated from the eye).⁵

In 1949, Howard Ridley was the first to place an artificial Intraocular Lens in the capsule that remained after ECCE. These IOL's included: Rigid PMMA, Foldable Acrylic/Silicone, Aspheric, Toric, Multifocal or Accommodating lenses.⁵

In 1988, Marquerite McDonald performed photorefractive keratectomy (PRK) laser surgery, which eventually led to Femtosecond Laser surgery in 1997 by biomedical engineers, Dr. Tibor Juhasz and Dr. Kurtz at the University of Michigan.⁶

600BC
[couching]

1753
[icce]

1949
[iol]

1997
[femto]

1747
[ecce]

1967
[phaco]

1988
[prk]

01

[Robots⁷]

- Vein Cannulation
- Vitreoretinal Surgery
- Removes Tremor
- Z-Axis Depth

preceyes.ni

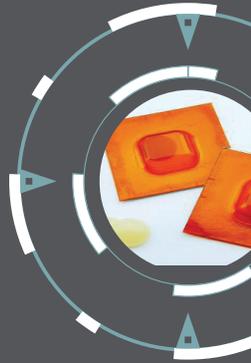
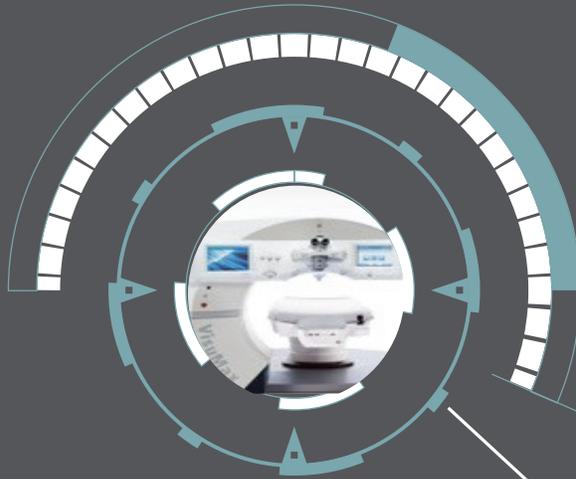


02

[FEMTO⁸]

- Better Precision
- More Efficiency
- Rapid Recovery

zeiss.com

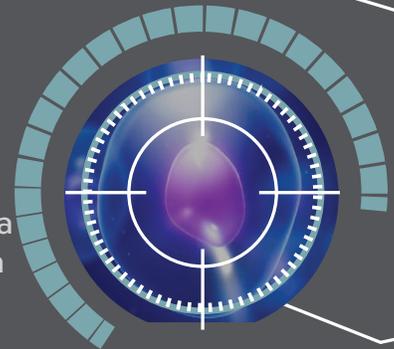


03

[Stem Cells⁹]

- Cure Choroideremia
- Degenerative Retina

nightstarx.com

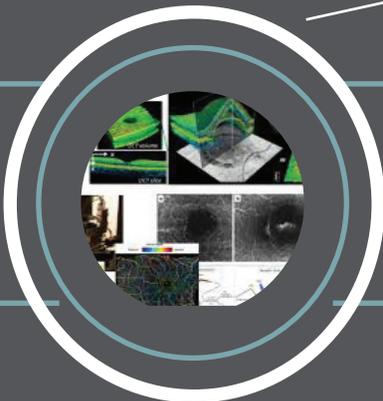


04

[Algorithms¹⁰]

- Video Feed Inputs
- Neuron Mapping

google.com

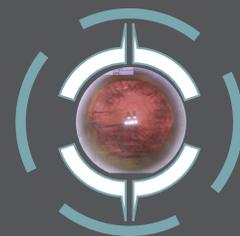


05

[3D¹¹]

- 3D Visualization
- Guidance Software
- More Ergonomic

truevisionsys.com





08

[All-In-One¹⁴]

- Pre-Op, Surgery, Post-Op
 - Less Phaco/Microscope adjustments w/thinner back
- mti.net



10

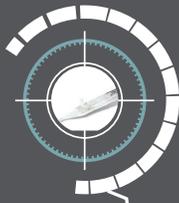
[Dropless¹⁶]

- Inject Antibiotic before closing
 - No post-op drops
- imprimisrx.com

09

[Pre-Loaded IOL¹⁵]

- More Efficient
 - Minimizes Infection
- abbottmedicaloptics.com



07

[IV Free¹³]

- MKO Melt Lozenge
 - Reduce IV Costs
 - Dissolves Minutes
- imprimisrx.com

06

[OCT¹²]

- Intraoperative Clear Tissue Visualization
 - Microscope Integration
 - Anterior/Posterior Scans
- zeiss.com



10

[TECH TRENDS]

Reference 17 & 18



SOLO

As a student at Choate/Rosemary Hall High School, Kerry Solomon always wanted to be a doctor because of his love for science and medicine.

Initially, he planned to pursue a career in heart surgery, but it didn't offer the level of technology and diagnosis that Ophthalmology could offer.

He attended the University of Vermont College of Medicine for his undergraduate and graduate degrees. Following graduation,

he accepted an internship at Yale University and completed his residency at University of Kentucky and a fellowship at University of Utah and John Hopkins Hospital.

He spent the next 17 years at South Carolina Medical Center, before becoming managing partner at Carolina Eyecare Physicians for the past 7 years.

"I wanted to improve the quality of life for people. I am giving sight back to people so they can enjoy their favorite hobbies," states Dr. Solomon.



01
[entry]



02
[pre-op]



03
[transport]

MON / SOLUTION

Solomon is a pioneer in ophthalmology. He is the first surgeon to perform LASIK, iStent, PRK, Astigmatism Correction, OZil Ultrasound and more in South Carolina.

He has been ranked in the top 1% of ophthalmic surgeons nationwide in US News and World report. He has been ranked as one of 'America's Best Doctors' annually for cataract and refractive surgery since 2003. He has also been voted in the Top Fifty Opinion Leaders in Ophthalmology in the world by his peers since the inception of this award in 2005.

The secret to Solomon's success is his love for new technology and innovative processes. Dr.

Solomon wants to create a spa like experience with ambient lighting, comfortable seating, beautiful decor and soothing music to create a sense of peace and tranquility.

As highlighted below, patient's check in with pre-op and are seated in a MTI 440 Mobile Stretcher Bed and receive eye drops. They are then wheeled into a laser or operating room. The patient is reclined to a surgery position for their surgical procedure. After surgery, the patient is raised to the upright position and is wheeled to a recovery room for discharge.

The Solomon Solution to efficiency is one

chair for pre-op, surgery and transport. It is also having multiple rooms for each step of the process, which allows the OR Supervisors and Nurses to setup multiple pre-op and recovery rooms. This allows over 100 patients a day to receive cataract surgeries in 8-10 minutes.¹⁹

drkerrysolomon.com



04
[surgery]



05
[recovery]



06
[exit]



CIONNI

simplicity

Bob Cionni was born and raised in Cincinnati before moving to Utah. As a child he was fascinated with the 5 senses...sight, taste, touch, smelling and hearing.

“During high school, I knew that I wanted to be a doctor that helped patients see a sunset or their loved ones faces,” exclaimed Cionni.

Cionni attended the University of Cincinnati, followed by an ophthalmology residency at The University of Louisville and a fellowship in cataract and implant surgery at the Cincinnati Eye Institute. Dr. Cionni practiced in Cincinnati for 20 years,

before becoming Medical Director for the Eye Institute of Utah.

Bob has been voted as one of the Best Doctors in America and Castle Connolly’s Top Doctor. He is the immediate Past President of the ASCRS.

Dr. Cionni has designed special implants and surgical techniques to improve surgical outcomes for cataracts, congenital lens subluxation and zonular weakness. His insights on sutureless cataract surgery are highlighted in the following steps:

1. The Circulator (RN) and Surgical

Tech (Triage) prep the room for surgery every 6–8 minutes. The Circulator wheels the patients in the MTI 440 Mobile Stretcher Bed from the waiting room into the surgical room.

2. Patients are prepped for topical or IV anesthetic by the Anesthetist, and vital signs are monitored.

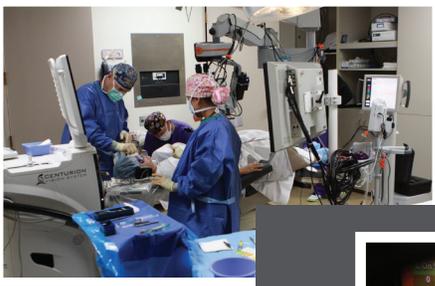
3. Numbing drops are applied to the eyes.

4. The patient is awake for the entire surgery.

5. The Doctor adjusts the Microscope, Phaco and MTI 440 Mobile

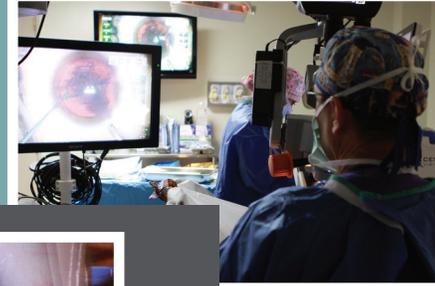
01

[pre-op]



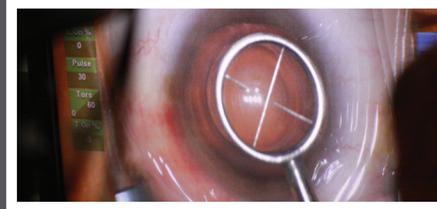
02

[3D Surgery]



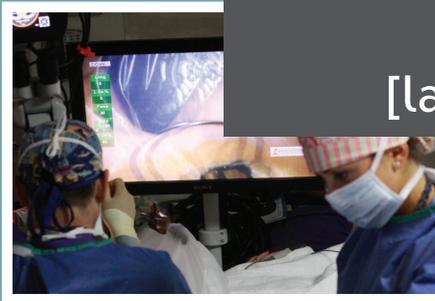
03

[lasik or zone]



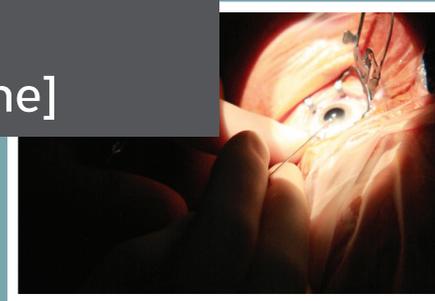
04

[iol lens]



05

[hydration]



Stretcher Bed with 3 sets of foot controls.

6. The Doctor uses 3D Glasses & a 3D monitor to perform the surgery.

7. About 40% of cases receive femtosecond laser capsulotomy and lens fragmentation; otherwise, an optical zone marker is used to center and size the capsulotomy.

8. 2 small incisions are made.

9. The doctor manipulates the Phaco hand piece and a second micro instrument to break up and aspirate the cataract, while infusion from the

Phaco hand piece keeps the eye formed.

10. Lights are shut off and the client looks at a red dot from the ORA Machine to help the doctor determine the best power for the artificial lens (IOL). The IOL is inserted into the capsular bag, removing the need for glasses.

11. The doctor hydrates the 2 small incisions so that no stitches are needed.

12. Patients are wheeled in the MTI 440 Mobile Stretcher Bed back to the recovery room for instructions and are released after 10-15 minutes.

13. The overall goal is to move between 2 operatory rooms every 10-15 minutes. A team of 3-6 medical staff, comprised of the Surgeon, OR Supervisor, Anesthesiologist, RN and Surgical Tech are used. The team has 6-8 minutes to prep the next patient and get all the equipment, instrument trays and operating room ready for the next patient.

14. In 2 hours, 10 cataract surgeries are performed.²⁰

theeyeinstitute.com

ergonomic



01 | 4 Programmable functions (*lift, tilt, back & foot*) allows the physician to quickly move from pre-op, transport, surgery and recovery

02 | Oval Articulating Headrest allows easy adjustments for eye alignment compared to other chairs that only offer tilt

03 | The headrest stabilizer provides better eye stabilization and less head movement (*not pictured*)

04 | The ultra-thin contoured back provides room for knees and minimize phaco and microscope adjustments

05 | All-Steel frame and composite cover allows the chair to last longer

06 | Slide back arms or bed rails allow patients to get in and out easier

07 | Corded Hand Control for easier surgical adjustments

08 | Flexible oxygen tube for patient breathing and draping (*not pictured*)

09 | Memory foamed cushions for extra patient comfort

10 | Multi-directional casters allows easier movement during transport

11 | Ultra light Lithium Ion Battery

equipment



Medical Technology Industries partnered with Dr. Solomon and Dr. Cionni to develop a superior mobile stretcher bed.

The end result was the MTI 440 Mobile Stretcher Bed you see to the left.

Along with invention of the stretcher bed, was a variety of accessories that revolutionized the industry. The headrest stabilizer was created to keep the head stationary instead of using tape that left adhesive on the headrest and made the patient uncomfortable. The flexible oxygen tube created the perfect draping system, instead of using a clip on a IV pole. Finally, the head wrist supports helped reduce issues of carpal tunnel.

The MTI 440 Mobile Stretcher Bed was complimented with the 331 Hydraulic Stools w/ Twin Arms and Ergo Backrest to easily make adjustments to their stool while adjusting their bed, Phaco or microscope. It also added additional arm support during the surgery.

MTI can also provide Cataract or Retinal Surgeons mobile instrument cabinets, instrument tables, exam and surgical lights, recovery chairs and side chairs for any office design.²¹



cataract references

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