Document Date: 2/15/2022

NCT: NCT04436198

The Investigation of Capsular Tension Rings in Intraocular Lens Rotation

# EIRB Protocol Template (Version 1.10)

## 1.0 General Information

***Please enter the full title of your study:**

The Investigation of Capsular Tension Rings in Intraocular Lens Rotation

***Please enter the Protocol Number you would like to use to reference the protocol:**

FWH20200112H
* This field allows you to enter an abbreviated version of the Protocol Title to quickly identify this protocol.

**Is this a multi-site study (i.e. Each site has their own Principal Investigator)?**

No

**Does this protocol involve the use of animals?**

○ Yes ◉ No

## 2.0 Add Site(s)

**2.1 List sites associated with this study:**

| Primary Dept? | Department Name |
|---|---|
| ◆ | **USAF** - 99 MDG/MOFMC |

## 3.0 Assign project personnel access to the project

**3.1 *Please add a Principal Investigator for the study:**

Lieberman, Rachel Anne, MD

Select if applicable

☐ Student ☐ Site Chair
☐ Resident ☐ Fellow

**3.2 If applicable, please select the Research Staff personnel:**

A) Additional Investigators

B) Research Support Staff

BIRD, CHRISTOPHER W
Research Coordinator
Bogdanovich, Tracy Lee
Research Coordinator
Clark, Jill Marie, MBA/HCM
Research Coordinator
Crawford, Amanda J
Research Coordinator
Estrada, Jonica
Research Coordinator
Huffman, Sandra G
Research Coordinator
Moss, Jennie B
Research Coordinator
Shaffer, Daniel WILLIAM
Research Coordinator

**3.3 *Please add a Protocol Contact:**

Clark, Jill Marie, MBA/HCM
Huffman, Sandra G
Lieberman, Rachel Anne, MD

The Protocol Contact(s) will receive all important system notifications along with the Principal Investigator. (i.e. The protocol contact(s) are typically either the Protocol Coordinator or the Principal Investigator themselves).

**3.4 If applicable, please select the Designated Site Approval(s):**

Add the name of the individual authorized to approve and sign off on this protocol from your Site (e.g. the Site Chair).

## 4.0 Project Information

**4.1 * Has another IRB/HRPP reviewed this study or will another IRB/HRPP be reviewing this study? If Yes, answer the questions according to the IRB/HRPP Determination.**

○ Yes ◉ No

| IRB Name | Review Date | Determination |
|---|---|---|
| No records have been added | | |

**4.2 * Is this a research study or a Compassionate Use/Emergency Use/HUD project?**

◉ Yes ○ No

**4.3 What type of research is this?**

☑ Biomedical Research
☐ Clinical trial (FDA regulated)
☐ Behavioral Research

- [ ] Educational Research
- [ ] Psychosocial Research
- [ ] Oral History
- [ ] Other

**4.4 Are you conducting this project in pursuit of a personal degree?**

- ○ Yes
- ◉ No

**4.6 * Is this human subjects research? (As defined by 32 CFR 219) Human subject means a living individual about whom an investigator (whether professional or student) conducting research:**
**(i) Obtains information or biospecimens through intervention or interaction with the individual, and uses, studies, or analyzes the information or biospecimens; or**
**(ii) Obtains, uses, studies, analyzes or generates identifiable private information or identifiable biospecimens.**

- ◉ Yes
- ○ No

**4.7 * Do you believe this human subjects research is exempt from IRB review?**

- ○ Yes
- ◉ No

## 5.0 Personnel Details

**5.1 List any Research Team members without EIRB access that are not previously entered in the protocol:**

No records have been added

**5.2 Will you have a Research Monitor for this study?**

- ◉ Yes
- ○ No
- ○ N/A

**Research Monitor Qualifications**
Ensure the individual has expertise consistent with the nature of risk(s) identified within your study and is independent of the team conducting the research.

Research Monitor Role:

Provide oversight throughout the investigation. The monitor will work full-time at the study location and oversee the patient preoperative, intraoperative, and postoperative process. The monitor will review data collection and analysis as well. The monitor will ensure all informed consents are signed and all records suitably kept and stored securely.

If applicable, you may nominate an individual to serve as the Research Monitor:

| Selected Users |
| --- |
| David Moss |

## 6.0 Data/Specimens

**6.1 Does the study involve the use of existing data or specimens only (no interaction with human subjects)?**

○ Yes ◉ No

## 7.0 Funding and Disclosures

**7.1 Source of Funding:**

| Funding Source | Funding Type | Amount |
|---|---|---|
| No records have been added | | |

Total amount of funding:

**7.2 Do you or any other Investigator(s) have a disclosure of a personal interest or financial nature significant with sponsor(s), product(s), instrument(s) and/or company(ies) involved in this study?**

○ Yes ◉ No

If Yes, complete and attach Conflict of Interest forms for all key personnel

## 8.0 Study Locations

**8.1 Is this a collaborative or multi-site study? (e.g., are there any other institutions involved?)**

○ Yes ◉ No

**8.2 Study Facilities and Locations:**

| Institution | Site Name | Site Role | FWA or DoD Assurance Number | Assurance Expiration Date | Is there an agreement? | IRB Reviewing for Site |
|---|---|---|---|---|---|---|
| Air Force | 99MDG /Nellis AFB | Performance site | DHA000004 | 02/15 /2026 | | : NMCSD IRB |

Other:

| Other Institution Site | Site Role | FWA or DoD Assurance Number | FWA or DoD Expiration Date | Is there an agreement? | IRB Reviewing for Site |
|---|---|---|---|---|---|
| No records have been added | | | | | |

**8.3 Are there international sites?**

Attach international approval documents, if applicable, when prompted. Note: Ensure local research context has been considered

○ Yes ◉ No

### 8.4 Is this an OCONUS (Outside Continental United States) study?

○ Yes ◉ No

Select the area of responsibility:

Have you obtained permission from that area of responsibility? (This is a requirement prior to study approval)

○ Yes ○ No

## 9.0 Study Details

### 9.1 Key Words:

Provide up to 5 key words that identify the broad topic(s) of your study

Capsular Tension Ring; intraocular lens; ophthalmology; cataract surgery; toric lens

### 9.2 Background and Significance:

Include a literature review that describes in detail the rationale for conducting the study. Include descriptions of any preliminary studies and findings that led to the development of the protocol. The background section should clearly support the choice of study variables and explain the basis for the research questions and/or study hypotheses. This section establishes the relevance of the study and explains the applicability of its findings

This study has the potential to improve surgical outcomes in cataract surgery with toric intraocular lenses. Twenty million people have cataract surgery annually worldwide, and approximately 30% have visually significant astigmatism and are candidates for toric intraocular lenses. In turn, postoperative uncorrected visual acuity depends on the toric axis. For every degree of rotation away from the target axis, there is a 3.3% decrease in the astigmatism correction. This means that if the toric intraocular lens is rotated 10%, there is a 30% decrease in the correction of astigmatism. This generally negates the benefit of the toric lens, requiring correction for the refractive error.[1-4] Implanting a capsular tension ring is a simple surgical technique that has the potential to reduce toric rotation and improve refractive error.

Instead of a round cornea (like a basketball), some patients have a more oblong cornea (like a football). This is called astigmatism, and it can affect whether patients require glasses or other refractive correction in order to see clearly. Toric intraocular lenses are FDA-approved for use during cataract surgery to correct refractive error due to corneal astigmatism. This improves patients' refractive error and makes it less likely that they will need glasses after cataract surgery. These intraocular lenses are shaped to provide astigmatism correction at a marked axis denoted with dots on the surface of the lens. The lenses are rotated to the desired target axis after placement in the lens capsular bag during surgery. Sometimes the lenses rotate out of place after the surgery, which reduces the effectiveness of astigmatism correction.

Many factors have been shown to affect intraocular lens position: lens material, axial length of the eye, size of the capsulorrhexis, presence of posterior capsulotomy or asymmetric contraction of the capsular bag, viscoelastic removal, and final lens axis.[5] Some surgeons have questioned whether a capsular tension ring (CTR) can reduce the amount of rotation. The capsular tension ring (CTR) is a thin, curved implant composed of polymethylmethacrylate. It stabilizes the capsular bag, equally distributing tension to centralize and stabilize the bag when zonules are weakened or missing.

The FDA has granted an Investigational Device Exemption (IDE# G190139) to approve the use of capsular tension rings in this study. This is considered a significant risk investigational device that is being used during routine cataract surgery as part of a clinical investigation. This extends the use of this device for eyes with normal, intact zonules and a stable lens capsule for the purposes of this study.

Previous studies have looked at rotational stability of toric IOLs with capsular tension rings and found that CTR improve stability. Rastogi *et al* randomized 50 eyes to Auroflex toric IOL alone or toric IOL plus CTR.[5] The eyes with a CTR rotated less than the eyes without the CTR, and the difference was statistically significant (1.85 ± 1.72° in eyes with a CTR and 4.02 ± 2.04° in eyes without CTR, P-value = 0.003).

Several case reports and studies have looked at the effect of CTR in rotational stability in patients with axial myopia. Increasing axial length is associated with increased toric IOL rotation.[6] Zhao *et al* studied 36 eyes with axial myopia, in which 16 were treated with CTR and 18 without.[7] Acrysof SN6ATY IQ toric intraocular lenses were used. There was significantly less rotation with the use of CTR. A case report of two patients with high axial length demonstrated rotation when no CTR was inserted, but stability with use of the CTR.[8] One patient had an AcrySof lens made by Alcon Laboratories, Inc. and one patient had Tecnis toric lens made by Johnson & Johnson Vision. An additional case report described an eye in which two CTR were required to prevent rotation in an AcrySof lens.[9]

The lens material can impact the amount of rotation. AcrySof toric intraocular lenses (Alcon Laboratories, Inc.) have been shown to rotate less than Tecnis toric intracoular lenses (Johson & Johnson Vision), although other brands may rotate even less than both of those.[1, 10] Comparison has shown that Precizon toric lenses (Ophtec) has slightly less rotation than Tecnis.[11] However, no prospective studies have been published to date using capsular tension rings with a newly available lens, the Tecnis Eyhance Toric II lens (Johnson & Johnson Vision). Johnson & Johnson Vision toric intraocular lenses are widely used in the United States due to some of their unique properties, including a square-edge design that reduces posterior capsular opacification, ease of use, and excellent optics. Since more research is needed to determine whether capsular tension rings reduce intraocular lens rotation, and no research has been done with this technique using Johnson & Johnson intraocular lenses, it is worthwhile to study whether capsular tension rings may play a helpful role in reducing rotation in these lenses.

**9.3 Objectives/Specific Aims/Research Questions:**

Describe the purpose and objective(s) of the study, specific aims, and/or research questions /hypotheses

**Null Hypothesis:** The use of a capsular tension ring inside the capsular bag will not reduce the degree of rotation of the toric intraocular lens, compared to lenses implanted without a capsular tension ring.
**Alternative Hypothesis:** The use of a capsular tension ring inside the capsular bag will reduce the degree of rotation of the toric intraocular lens, compared to lenses implanted without a capsular tension ring.
**Objective 1:** Determine whether the use of a capsular tension ring inside the capsular bag will reduce the degree of rotation of the toric intraocular lens, compared to lenses implanted without a capsular tension ring.

### 9.4 Study Design:

Describe study design in one to two sentences (e.g., prospective, use of existing records/data /specimens, observational, cross-sectional, interventional, randomized, placebo-controlled, cohort, etc.). Specify the phase – Phase I, II, III, or IV – for FDA-regulated investigational drug research

To investigate whether implantation of a capsular tension ring device will affect the degree of rotation of an implanted toric intraocular lens following cataract surgery.

### 9.5 Target Population:

Describe the population to whom the study findings will be generalized

Active duty and DoD beneficiaries aged 30 years or older undergoing cataract surgery
Corneal astigmatism ≥ 1.0 D and a surgical plan that includes a toric intraocular lens for astigmatism correction.

### 9.6 Benefit to the DoD:

State how this study will impact or be of benefit to the Department of Defense

Uncorrected visual acuity affects warfighter capability to function in combat. Improving uncorrected visual acuity is a goal of military eye care, as evidenced by the robust military refractive surgery program and use of premium intraocular lenses, including toric lenses, at military treatment facilities. Although few active duty members require cataract surgery, those who do may benefit from the outcomes of this study in improving astigmatism correction. Improved visual outcomes in military retirees will also benefit readiness, as many former military members remain in the Inactive Ready Reserves, serve in the Reserves or National Guard, work as contractors on deployed locations overseas, or serve as mentors, leaders, and ambassadors in the community to serve military needs and mission requirements.

## 10.0 Study Procedures, Data Management, and Privacy

### 10.1 Study Procedures:

Describe step-by-step how the study will be conducted from beginning to end

The study is a prospective, subject-blinded investigation of whether implanting capsular tension rings with intraocular lenses affects rotational stability of the lens. Male and female Active Duty and DoD beneficiaries who satisfy the inclusion/exclusion criteria will be offered an opportunity to participate. They will be recruited from the ophthalmology clinic located at the Mike O'Callaghan Military Medical Center, 99MDG with prior verbal or written authorization from the patient, the attending physician will refer the patient to the Research Team to obtain more detailed information concerning the study. No research-related procedures will be implemented without the subject first signing an Informed Consent and HIPAA Authorization Document. Each eye will

be assigned a unique study code via a random number generator called the Subject Identification code (001, 002, 003, etc) and randomized independently to the treatment or control group. All of the below items are research-related unless marked as 'standard of care':

This study has been identified as a significant risk device under a Food and Drug Administration (FDA) approved Investigational Device Exemption (#G190139).

**Preoperative Screening**:

- Obtained Informed Consent and HIPAA Authorization.
- Record the date of birth, age, gender, race, ethnicity, DoD ID number, phone number(s) and e-mail addresses (used for scheduling). (standard of care)
- Review ocular exam and ocular history to verify the Enrollment Criteria. This will include review of previous ophthalmology encounters, ocular history, ocular exam, refractive error, and corneal astigmatism. (standard of care)
- Potential subjects will be fully informed of the risks of the study. They will be clearly informed that the study requires dilation at postoperative visits, which adds about 30 minutes to the duration of the visit.

One additional note on the number of visits described in this study: The ICD states that the subject may have seven outpatient visits for the study, yet five outpatient visits are described in the Protocol and ICD. This is because patients with both eyes enrolled will require visits on Postoperative Day #1 and Postoperative Week #1 for each eye. That is, the first eye will be checked on Postoperative Day #1 and Postoperative Week #1, then the patient will undergo surgery for the second eye. There will then be an additional five postoperative visits after the second eye has surgery (Postoperative Day #1, Postoperative Week #1, Postoperative Month #1, Postoperative Month #3, and Postoperative Month #6). Please see the lists below for clarification.Patient with one eye enrolled will attend:

- Postoperative Day #1 visit
- Postoperative Week #1
- Postoperative Month #1
- Postoperative Month #3
- Postoperative Month #6

Patient with both eyes enrolled will attend:

- Surgery for the first eye
- Postoperative Day #1 visit for the first eye
- Postoperative Week #1 visit for the first eye
- Surgery for the second eye
- Postoperative Day #1 visit for the second eye
- Postoperative Week #1 visit for the second eye
- Postoperative Month #1 visit for both eyes
- Postoperative Month #3 visit for both eyes
- Postoperative Month #6 visit for both eyes

Criteria for Enrollment of one or both eyes:

- Criteria will be applied to each eye individually in order to determine if one or both eyes may be enrolled in the study.
- Patients will be permitted to enroll both eyes only if both eyes meet all criteria.

For example, if only one eye meets criteria (for example, one eye has a surgical plan that includes a toric IOL and the other eye doesn't), then only one eye will be enrolled in the study. However, if the fellow eye also meets criteria, then both eyes will be enrolled in the study.

**Lens Selection**: The patients will undergo standard of care preoperative measurements and planning. The surgeon will evaluate preoperative measurements and use lens calculations, as well as a discussion with the patient, to identify whether a toric lens will be used and to determine the IOL power, cylinder, and target axis (standard of care). Preoperative measurements will be taken using IOL-Master 700, with the addition of the Pentacam and automatic keratometry as needed (standard of care). The toric lens used will be either Tecnis toric II or the Tecnis Eyhance Toric II intraocular lense (Johnson & Johnson Vision). The surgeon, in conjunction with a thorough discussion with the patient, will decide whether to use the Tecnis Toric II or the Tecnis Eyhance Toric II lens based on the patient's pre-existing ocular conditions (prior corneal refractive surgery, irregular corneal astigmatism, severe corneal dystrophy, macular disease, optic atrophy, etc.), refractive goals, lens status of the other eye, and other preoperative factors. All lenses will be used on label (standard of care).

**Capsular Tension Ring Selection:** The capsular tension rings used in this study will be the MORCHER® EYEJET® CTR Types 14, 14A, and 14C. MORCHER® EYEJET® CTR is a preloaded single-use injector plus capsular tension ring. It is available in two variations: for implantation clockwise (right), and for implantation counterclockwise (left). The clockwise (right) variation will be used in this study.

As recommended by the MORCHER® Instructions for Use, the anatomy of the eye, specifically the bulbous (axial) length, will be taken into account in the selection of the proper CTR size. CTR model 14C is 13.0mm in overall diameter and has a compressed diameter of 11 mm. It is intended for implantation in eyes with axial length of 24-28 mm. CTR model 14 is 12.3 mm in overall diameter and compresses to 10.0 mm. It is intended for implantation in eyes with axial length less than 28 mm. CTR model 14A is 14.5 mm in overall diameter and compresses to 12.0 mm. It is intended for implantation in eyes with bulbous length greater than 28 mm. Measurements taken preoperatively on the IOL Master 700 will be used to determine the axial length of the study eye. If the axial length cannot be determined using the IOL Master 700, then the axial length measured by non-contact immersion A-scan will be used. For this study, the following selection protocol will be used (standard of care):

- Axial length > 28.0 mm: CTR model 14A
- Axial length 24.0-28.0 mm: CTR model 14C
- Axial length < 24.0 mm: CTR model 14

Labeling: The outer box of the capsular tension rings used in this study will be clearly labeled with the following statement: "CAUTION—Investigational Use. Limited by Federal (or United States) law to investigational use." This is in accordance with FDA-approved labeling procedures. In addition, the capsular tension ring selected for each eye will be packaged with the chosen intraocular lenses and labeled with the patient's name to prevent another patient receiving the device accidentally.

**Randomization:** Each eye undergoing cataract surgery will be randomized into a **control or treatment** group. If both eyes meet enrollment criteria, then each eye will be randomized independently. For patients able to enroll both eyes into the study, potential outcomes could be: a. one eye could be randomized into the control group and one eye could be randomized into the treatment group, b) both eyes could be randomized into the control group, or c) both eyes could be randomized into the treatment group.

- Control group: toric IOL only
- Treatment group: toric IOL plus capsular tension ring

Assignment of the eye to the control or treatment group will be revealed during the cataract surgery at the point of potential capsular tension ring insertion. The surgeon and clinical staff (ophthalmic technicians and nurses) will not know whether the eye is in the treatment/control group until after the cataract has been removed and it is time for potential capsular tension ring placement. The eye will have been previously assigned to the control or treatment group using a random number generator by clinical research personnel, who are not involved in patient care. The group assignment will be documented in an opaque, sealed envelope, which will be present in the operating room at the time of surgery. The envelope will be opened by operating room staff after lens removal, and the surgeon will be informed. If the capsular tension ring is to be implanted, the correct size will be selected and verified, then implanted.

It was recommended by the reviewers during the FDA Investigative Device Exemption (IDE) approval process that the assignment to the control or treatment group should be revealed as late as possible (that is, during surgery immediately before the capsular tension ring would need to be inserted). This is to prevent the surgeon's technique during the first part of the cataract surgery from influencing the outcome. For example, there is a point during the surgery where the surgeon makes a round, even opening in the lens capsule called a capsulorrhexis. The size and contour of the capsulorrhexis have been thought to influence lens position and rotation later on, and therefore would affect the results of the study. It is important that the surgeon make a round, even capsulorrhexis opening without being influenced by whether the eye is assigned to the control or treatment group. It may also be helpful to know that the decision to implant a capsular tension ring for its usual indication (weakened or missing zonules) is often made during surgery, when zonular weakness is identified. The method of our study therefore mimics a common use of capsular tension rings.

**Surgery:** Patients will undergo manual phacoemulsification small-incision cataract surgery. The preoperative axis for toric placement will be marked while seated upright in the preoperative holding area. Standard of care phacoemulsification cataract surgery through a manual clear corneal incision will then take place. For the treatment group, after completing removal of the lens and cortex, the capsular bag will be inflated with cohesive viscoelastic and the capsular tension ring inserted. The intraocular lens will be placed in the capsular bag. The viscoelastic

material will be removed, with attention given to careful removal behind the IOL. The lens will be rotated to the final target axis. Care will be taken to ensure the final rotation occurs in the direction of haptic orientation (clockwise). The techniques used in the surgery will be standard of care.

If both eyes are enrolled in the study, there will be a minimum time of 7 days between surgery dates.

If both eyes are enrolled in the study, then the visits on post-operative day #1 and post-operative week #1 will involve dilation and slip lamp photography only on the eye which has most recently had surgery. The rest of the post-operative visits (month #1, month #3, month #6) will be combined visits with dilation and slit lamp photography for both enrolled eyes. Please see the description of the study visits, below.

During the pre-operative anesthesia visit, which is standard of care for this surgery, subjects will receive either a standard of care pregnancy test or be asked about their ability to become pregnant and/or lactating. If they are pregnant or lactating, they will not be eligible for this research study.

**Post-Operative Day #1 Visit:**

- The eye enrolled in the study will be dilated and slit lamp photography taken using retro-illumination. A standard of care postoperative evaluation will be performed, including checking visual acuity, eye pressure, slit lamp exam, and the rest of the postoperative evaluation.
- Dilation and slit lamp photography will be performed only on the post-operative day #1 eye.

**Post-Operative Week #1 Visit (5-10 days after surgery):**

- The eye enrolled in the study will be dilated and slit lamp photography taken using retro-illumination. A standard of care postoperative evaluation will be performed, including checking visual acuity, eye pressure, slit lamp exam, and the rest of the postoperative evaluation.
- Dilation and slit lamp photography will be performed only on the post-operative week #1 eye.

**Post-Operative Month #1 Visit (4-6 weeks after surgery):**

- The eye(s) enrolled in the study will be dilated and slit lamp photography taken using retro-illumination. A standard of care postoperative evaluation will be performed, including checking visual acuity, eye pressure, slit lamp exam, and the rest of the postoperative evaluation.
- If both eyes are enrolled, dilation and slit lamp photography will be performed on both eyes.

**Post-Operative Month #3 Visit (75-120 days after surgery):**

- The eye(s) enrolled in the study will be dilated and slit lamp photography taken using retro-illumination. A standard of care postoperative evaluation will be performed, including checking visual acuity, eye pressure, slit lamp exam, and the rest of the postoperative evaluation.
- If both eyes are enrolled, dilation and slit lamp photography will be performed on both eyes.

**Post-Operative Month #6 Visit (165-210 days after surgery):**

- The eye(s) enrolled in the study will be dilated and slit lamp photography taken using retro-illumination. A standard of care postoperative evaluation will be performed, including checking visual acuity, eye pressure, slit lamp exam, and the rest of the postoperative evaluation.
- If both eyes are enrolled, dilation and slit lamp photography will be performed on both eyes.If both eyes are enrolled, dilation and slit lamp photography will be performed on both eyes.

**MISSED STUDY VISITS: Research subjects will remain in the study and be contacted for follow up visits up to the post-operative month #6 visit (up to 210 days), regardless of how many post op visits that they have missed.**

If the scheduled visit does not take place or the dilation and slit lamp photography are not performed (for example, if the patient misses an appointment or has to leave prior to dilation and photography), then the patient will be contacted to return and the dilation/slit lamp photography completed at the next available opportunity. This may involve dilation/slit lamp photography at other intervals than noted above. In addition, if the patient comes in for any additional post-operative visits, the investigator may request additional dilation and/or slit lamp photography during the visit, if the patient is agreeable.

The capsular tension ring will not be visible in the slit lamp photos or during the eye exams. The patient will be blinded as to which eye is in the treatment or control group. The slit lamp photos will be de-identified and used to determine the axis of the toric IOL by evaluators blinded to the patient identity and control/treatment group. The toric axis will be identified using either ImageJ (NIH) or Adobe Illustrator by measuring the angle between a straight line drawn across the toric axis markers and a straight line at the horizontal axis (0 degrees).

**10.2 Data Collection:**

Describe all the data variables, information to be collected, the source of the data, and how the data will be operationally measured.

Standard of care preoperative testing (to include optical biometry measurements with the IOL Master 700 platform, Pentacam, and autokeratometry measurements) will be performed.

Visual acuity will be tested in each eye individually and measured at distance using a Snellen Chart. Preoperatively, the best-corrected visual acuity will be recorded. Postoperatively, the uncorrected visual acuity will be recorded at post-operative day #1 and post-operative week #1, and both uncorrected and corrected visual acuity will be recorded at the subsequent postoperative visits.

Eye pressure will be measured using Goldmann applanation. If Goldmann applanation cannot be obtained (for example, due to poor patient cooperation), then the Avia Tonopen will be used. The method of measurement will be documented in the patient chart.

The ophthalmologist will perform slit lamp photography to document the toric axis. Anterior segment photographs will focus on the intraocular lens toric axis markings and will be taken using a Haag Streit camera and EyeSuite program. In addition, the ophthalmologist will use the slit lamp light beam to manually measure the toric axis and record it in the patient chart. This will serve as a secondary method to document toric axis.

The study data collected will be entered into a spreadsheet.

At the conclusion of the study, only coded information will be sent for analysis.

**10.3 At any point in the study, will you request, use, or access health information in any form, including verbal, hard copy and electronic?**

(•) Yes ( ) No

**10.4 Review the definitions below and respond to the following two questions. If you are not sure of the answers, email DHA.PrivacyBoard@mail.mil for assistance. The *Military Health System (MHS)* is defined as all DoD health plans and DoD health care providers that are organized under the management authority of, or in the case of covered individual providers, assigned to or employed by, the Defense Health Agency (DHA), the Army, the Navy, or the Air Force *MHS workforce members* are employees, volunteers, trainees, and other persons whose conduct, in the performance of work for the MHS, is under the direct control of the MHS, whether or not they are paid by the MHS. *MHS business associates* are persons or entities that provide a service to the MHS and require protected health information (PHI) to provide the service.**

**Are you an MHS workforce member?**

- (•) Yes, I am an MHS workforce member
- ( ) No, I am not an MHS workforce member

**Are you an MHS business associate?**

- ( ) Yes, I am an MHS business associate
- (•) No, I am not an MHS business associate

**10.5 Have you consulted with an MHS data expert to determine the data elements required for your study?**

Consulting with a data expert often saves time later in the compliance process because the data expert can advise on the data available in the numerous MHS information systems, the quality of that data and the methods for encrypting and collapsing data. To schedule a consult with an MHS data expert, send an email to: (**DHA.PrivacyBoard@mail.mil**)

- ( ) Yes, then complete the questions below according to the data consult
- (•) No, then complete the questions below according to the best of your knowledge

**10.6 Indicate how you will request data from the MHS. Select all that apply.**

- [ ] Talking with MHS health care providers or MHS health plans about specific research participants
- [x] Obtaining MHS hard copy records specific to research participants
- [x] Obtaining data from an MHS information system(s)

**10.7 If you are obtaining data from an MHS information system(s), indicate whether you plan to receive a data extract or whether you plan to access an MHS information system directly to create a data set.**

A data extract is when the MHS or a contractor provides the data set directly to the researcher. When receiving a data set through data extract, the researcher may indicate whether the data elements should be provided as is, encrypted or collapsed. In contrast to a data extract, access to an information system means that the researcher may directly access an MHS information system and create a data set for the research study

- [x] Data Extract
- [x] Access

**10.8 Do you intend to request de-identified data from the MHS in your research study?**

There are different two methods for de-identifying data pursuant to HIPAA:
1) Safe Harbor Method: Removing all of the identifiers listed in Table 1 below, provided that the researcher does not have actual knowledge that the remaining data can be used alone or in combination with other information to identify the individual who is the subject of the information
2) Statistical Method: An expert, with appropriate knowledge of and experience with generally accepted statistical and scientific principles and methods for rendering information not individually identifiable, determines that the data is not individually identifiable

( ) Yes (•) No

**10.9 Indicate the MHS information system(s) from which you will seek to obtain data**

If you do not know which system(s) contains the data elements you need, refer to the Guide for DoD Researchers on Using MHS Data or request guidance from an MHS data expert at: **DHA.PrivacyBoard@mail.mil**.

Below is a list of commonly used MHS systems. If the system from which you seek to obtain data is not listed below, list the name of the system in the "Other MHS Systems" category below
**PHI Systems:**

| MHS Information System | Requesting Data |
|---|---|

| |
|---|
| No records have been added |

**PII-Only Systems:**

| MHS Information System | Requesting Data |
|---|---|
| No records have been added | |

**De-Identified Data & Other Systems:**

| Information System | Requesting Data |
|---|---|
| Other MHS System (May include PII and/or PHI)<br><br>List other system here:<br><br>MHS Geneisis | : Yes |

**10.10 Do you intend to merge or otherwise associate the requested data with data from any sources outside of the MHS, including other DoD systems that are not part of the MHS?**

- ○ Yes, will merge data
- ◉ No, will not merge data

**10.11 Indicate the data elements about research participants or relatives, employers, or household members of the research participants that you will request from MHS hard copies or from MHS information systems.**
**If you will merge data, also indicate non-MHS data elements about research participants or relatives, employers, or household members of the research participants that you will have access to in any form or medium.**

| Data Element(s) | MHS | Non-MHS Systems | MHS Hard Copies |
|---|---|---|---|
| 1. Names | ☑ | ☐ | ☐ |
| 2. Postal address with only town, city, state and zip code | ☐ | ☐ | ☐ |
| 3. Postal address with all geographic subdivisions smaller than a state, including street address, city, county, precinct, zip code and their equivalent geocodes, except for the initial three digits of a zip code if, according to the current publicly available data from the Bureau of Census: 1) the geographic unit formed by | ☐ | ☐ | ☐ |

| | | | |
|---|---|---|---|
| combining all zip codes with the same three initial digits contains more than 20,000 people; and 2) the initial three digits of a zip code for all such geographic units containing 20,000 or fewer people is changed to 000 | | | |
| 4. Dates including all elements (except year) directly related to an individual, including birth date, admission date, discharge date, and date of death | ☐ | ☐ | ☐ |
| 5. Ages over 89 and all elements of dates (including year) indicative of such age, unless you will only request a single category of "age 90 or older" | ☐ | ☐ | ☐ |
| 6. Telephone numbers | ☑ | ☐ | ☐ |
| 7. Fax numbers | ☐ | ☐ | ☐ |
| 8. Electronic mail addresses | ☐ | ☐ | ☐ |
| 9. Social Security numbers (SSNs) | ☐ | ☐ | ☐ |
| 10. Medical record numbers | ☑ | ☐ | ☐ |
| 11. Health plan beneficiary numbers | ☐ | ☐ | ☐ |
| 12. Account numbers | ☐ | ☐ | ☐ |
| 13. Certificate /license numbers | ☐ | ☐ | ☐ |

| | | | |
|---|---|---|---|
| 14. Vehicle identifiers and serial numbers, including license plate numbers | ☐ | ☐ | ☐ |
| 15. Device identifiers and serial numbers | ☐ | ☐ | ☐ |
| 16. Web Universal Resource Locators (URLs) | ☐ | ☐ | ☐ |
| 17. Internet Protocol (IP) address numbers | ☐ | ☐ | ☐ |
| 18. Biometric identifiers, including finger and voice prints | ☐ | ☐ | ☐ |
| 19. Full-face photographic images and any comparable images | ☐ | ☐ | ☐ |
| 20. Any other unique identifying number, characteristic, or code (Diagnosis, DEERS ID, EDI-PI, Rank) | ☐ | ☐ | ☐ |

If you are obtaining SSNs, provide a justification as to why and explain why a substitute cannot be used

**10.12 Do you believe it is possible for the MHS data to become identifiable because of triangulation, a small cell size, or any unique data element(s)?**

Triangulation means using different data elements that are not themselves identifiable but that when combined can be used to identify an individual. For example, triangulation would use rank and race together to determine the identity of an individual with a particular health condition.

Small cell size means that there is only a small number of eligible individuals that satisfy the category description. Guidance for acceptable cell size is available from the Centers for Medicare and Medicaid Services. For example, the rank category of four star generals with a particular diagnosis may be less than 30, so the rank category may need to be expanded to include lower ranks.

A unique data element includes any unique features that are not explicitly enumerated in the categories of data in rows 1 – 20 of the table above (in Section 10.10), but that could be used to identify an individual. Unique data elements include characteristics that are not themselves

identifying, such as the rank of general or admiral, or a race or gender, but within the context of other information could be identifiable.

- ○ Yes, I believe there is a reasonable possibility the MHS data will become identifiable
- ◉ No, I believe there is no reasonable possibility the MHS data will become identifiable

**10.13 Have you completed and uploaded an appropriate HIPAA document ( i.e. HIPAA Authorization will be obtained or Waiver/alteration of HIPAA Authorization is being requested)?**

- ◉ Yes
- ○ No
- ○ N/A

**10.14 Managing Data (Data Management and/or Sharing Plan) and/or Human Biological Specimens for this Study:**

Include in this section the plan for acquiring data (both electronic and hard copy), access during the study, data/specimen storage and length of time stored, shipment/transmission, and the plan for storage and final disposition at the conclusion of the study. Describe any data agreements in place for accessing data within and/or outside of your institution (e.g., Data Sharing Agreement, Data Use Agreement, Business Agreements, etc.)

We are obtaining data for this study directly from the subjects during their research visits. During the study, the Informed Consents, HIPAA Authorization Documents, source documents, participant registration documents, identifiable Master Key, and any other study documents utilized during the study will be stored in a locked cabinet or electronically on a CAC-enabled government computer and password protected.

Medical records will be annotated with ICD-10 code Z00.6 to reflect the subjects' participation in a research study, in which they are receiving a research-related treatment intervention.

Long-term storage: When the IRB Study Closure Letter has been obtained from the IRB, the Informed Consents, HIPAA Authorization Documents, source documents, participant registration documents, identifiable Master Key, and any other study documents utilized during the study will be scanned into a CAC-enabled government computer and electronically maintained for a minimum of 6 years.

**10.15 Managing Data (Data Management and/or Sharing Plan) and/or Human Biological Specimens for Future Research:**

If the study involves collecting, storing, or banking human specimens, data, or documents (either by the Investigator or through an established repository) for FUTURE research, address. How the specimens/data will be used, where and how data/specimens will be stored (including shipping procedures, storage plan, etc.), whether and how consent will be obtained, procedures that will fulfill subjects' request as stated in the consent, whether subjects may withdraw their data/specimens from storage, whether and how subjects may be recontacted for future research and given the option to decline, whether there will be genetic testing on the specimens, who will have access to the data/specimens, and the linkage, the length of time that data/specimens will be stored and conditions under which data/specimens will be destroyed.

Subjects will be asked to consent to have their coded research data placed in the "Mike O'Callaghan Military Medical Center General Research Data Repository" (FWH20180064E), the coded data will be retained for possible use in future research. Subjects may choose either to not allow any further use of their coded data or give consent now for the use of the coded data to be used in future studies. This future research may be in the same area as the original study or it may be for a different kind of study. Any future research using retained data will require a research protocol for the proposed study approved by an Institutional Review Board or other authorized official responsible for protecting human subjects of research.

## 11.0 Statistical/Data Analysis Plan

**11.1 Statistical Considerations:**

List the statistical methods to be used to address the primary and secondary objectives, specific aims, and/or research hypotheses. Explain how missing data and outliers will be handled in the analysis. The analysis plan should be consistent with the study objectives. Include any sub-group analyses (e.g., gender or age group). Specify statistical methods and variables for each analysis. Describe how confounding variables will be controlled in the data analysis

The primary outcome and dependent variable will be the degree of toric rotation away from the target axis, and the time point of primary endpoint analysis will be when data for the last repeated measurement at 6 months has been obtained. The main treatment effect is a control group receiving a toric IOL only (Group 1) and a treatment group receiving a toric IOL plus capsular tension ring (Group 2). The statistical null hypotheses is as follows:

H01 — there is no difference in means of the degree of toric rotation away from the target axis between control and treatment groups

Subjects will be a random sample of left or right eyes of male and female patients seen in one Air Force medical treatment facility. The patients are presumed to be randomly selected from the population of patients obtaining similar care at this and other Air Force medical treatment facilities.

The study is organized as a mixed effects, randomized design. Subject (eye) is a random effect, as the patients whose eyes are the subjects of this study are presumed to have been randomly elected to obtain this treatment from the population of patients obtaining similar care at these Air Force medical treatment facilities, and the eyes are randomly assigned to treatment or control groups. Treatment is a fixed effect, as the effect of the intraocular lens and capsular tension ring cannot be generalized to other brands of toric intraocular lens or capsular tension rings.

Reference 5 states eyes treated with a CTR rotated a mean 1.85°(1.72 SD) and eyes without a CTR rotated a mean 4.02°(2.04 SD). The minimum clinically significant difference of toric rotation away from the target axis the researchers wish to detect in this study is 1.85°. Using these parameters, a priori power for a repeated measures n analysis of variance (rANOVA) was assessed using G*Power Version 3.1.9.3. (12). The results indicate 50 subjects (eyes) will have a power of 0.957 at = 0.05 to detect this minimum clinically significant difference between the treatment groups.

Total sample and treatment group means, standard deviations, medians, interquartile ranges (IQR) and ranges will be calculated for interval variables. Frequency distributions will be produced for nominal and ordinal variables. Visual acuity, toric power, intended toric axis, and other variables will be included in the analysis.

The null hypothesis, H01, will be tested by a mixed effects repeated measures analysis of variance (rANOVA) using a general linear model, yij= 0+ 1xij+ 2tij+ 0i+ ij , where x is the main treatment effect, t is time of repeated measure, and 0i represents the influence of individual i on his/her repeated observations.

Mr. Danny Sharon, Senior Research Biostatistician Subject Matter Expert for Clinical Research Management under contracts OMNI 0004 3-82 and OMNI 0005 3-126, is the statistical consultant supporting this study. Statistical analysis will be performed with R Version 3.5.1. (13)

**11.2 Sample Size:**

50 eyes (approximately 25 eyes in each group) -- We are enrolling by number of eyes. If subjects have one eye that meets enrollment criteria, then that eye will be randomized into the treatment or control group. If both eyes meet enrollment criteria, then each eye will be randomized independently.

**11.3 Total number of subjects requested (including records and specimens):**

50

**11.4 If you are recruiting by study arm, please identify the arms of the study and how many subjects will be enrolled in each arm**

Randomization: Each eye undergoing cataract surgery will be randomized into a control or treatment group. If both eyes meet enrollment criteria, then each eye will be randomized independently. For patients able to enroll both eyes into the study, potential outcomes could be: a. one eye could be randomized into the control group and one eye could be randomized into the treatment group, b) both eyes could be randomized into the control group, or c) both eyes could be randomized into the treatment group.
· Control group: toric IOL only
· Treatment group: toric IOL plus capsular tension ring
Assignment of the eye to the control or treatment group will be revealed during the cataract surgery at the point of potential capsular tension ring insertion. The surgeon and clinical staff (ophthalmic technicians and nurses) will not know whether the eye is in the treatment/control group until after the cataract has been removed and it is time for potential capsular tension ring placement. The eye will have been previously assigned to the control or treatment group using a random number generator by clinical research personnel, who are not involved in patient care. The group assignment will be documented in an opaque, sealed envelope, which will be present in the operating room at the time of surgery. The envelope will be opened by operating room staff after lens removal, and the surgeon will be informed. If the capsular tension ring is to be implanted, the correct size will be selected and verified, then implanted.

**11.5 Please provide a justification for your sample size**

Subjects will be a random sample of left or right eyes of male and female patients seen in one Air Force medical treatment facility. The patients are presumed to be randomly selected from the population of patients obtaining care at this Air Force medical treatment facilities.

The study is organized as a mixed effects, randomized design. Subject (eye) is a random effect, as the patients whose eyes are the subjects of this study are presumed to have been randomly selected to obtain this treatment from a population of patients obtaining care at this Air Force medical treatment facility, and the subjects (eyes) are randomly assigned to treatment or control groups. Treatment is a fixed effect, as the effect of the intraocular lens and capsular tension ring cannot be generalized to other brands of toric intraocular lens or capsular tension rings.

Reference 5 states eyes treated with a CTR rotated a mean 1.85°(1.72 SD) and eyes without a CTR rotated a mean 4.02°(2.04 SD). The minimum clinically significant difference of toric rotation away from the target axis the researchers wish to detect in this study is 1.85°. Using these parameters, a priori power for a repeated measures n analysis of variance (rANOVA) was assessed using G*Power Version 3.1.9.3. (12). The results indicate 50 subjects (eyes) will have a power of 0.957 at = 0.05 to detect this minimum clinically significant difference between the treatment groups.

**11.6 Data Analysis Plan: Complete description: Background, Objectives, Design, Step by Step how the project is going to be done, Data analysis plan:**

The primary outcome and dependent variable will be the degree of toric rotation away from the target axis, and the time point of primary endpoint analysis will be when data for the last repeated measurement at 6 months has been obtained. The main treatment effect is a control group receiving a toric IOL only (Group 1) and a treatment group receiving a toric IOL plus capsular tension ring (Group 2). The statistical null hypotheses is as follows:

H01 — there is no difference in means of the degree of toric rotation away from the target axis between control and treatment groups

Subjects will be a random sample of left or right eyes of male and female patients seen in one Air Force medical treatment facility. The patients are presumed to be randomly selected from the population of patients obtaining care at this Air Force medical treatment facilities.

The study is organized as a mixed effects, randomized design. Subject (eye) is a random effect, as the patients whose eyes are the subjects of this study are presumed to have been randomly elected to obtain this treatment from the population of patients obtaining similar care at these Air Force medical treatment facilities, and the subjects (eyes) are randomly assigned to treatment or control groups. Treatment is a fixed effect, as the effect of the intraocular lens and capsular tension ring cannot be generalized to other brands of toric intraocular lens or capsular tension rings.

Reference 5 states eyes treated with a CTR rotated a mean 1.85°(1.72 SD) and eyes without a CTR rotated a mean 4.02°(2.04 SD). The minimum clinically significant difference of toric rotation away from the target axis the researchers wish to detect in this study is 1.85°. Using these parameters, a priori power for a repeated measures n analysis of variance (rANOVA) was assessed using G*Power Version 3.1.9.3. (12). The results indicate 50 subjects (eyes) will have a power of 0.957 at = 0.05 to detect this minimum clinically significant difference between the treatment groups.

Total sample and treatment group means, standard deviations, medians, interquartile ranges (IQR) and ranges will be calculated for interval variables. Frequency distributions will be produced for nominal and ordinal variables.

The null hypothesis, H01, will be tested by a mixed effects repeated measures analysis of variance (rANOVA) using a general linear model, yij= 0+ 1xij+ 2tij+ 0i+ ij , where x is the main treatment effect, t is time of repeated measure, and 0i represents the influence of individual i on his/her repeated observations.

Mr. Danny Sharon, Senior Research Biostatistician Subject Matter Expert for Clinical Research Management under contracts OMNI 0004 3-82 and OMNI 0005 3-126, is the statistical consultant supporting this study. Statistical analysis will be performed with R Version 3.5.1. (13)

## 12.0 Participant Information

### 12.1 Subject Population:

Active duty and DoD beneficiaries aged 30 years or older undergoing cataract surgery. Patients who are pregnant or lactating will be excluded because the risks of surgery and post-operative medication to the unborn fetus are unknown. Patients under 30 years of age will not be included because they are likely to have congenital, pediatric, or juvenile-onset cataracts, which is outside the scope of this study. Corneal astigmatism ≥ 1.0 D and a surgical plan that includes a toric intraocular lens for astigmatism correction.

### 12.2 Age Range:

Check all the boxes that apply. if the age range of potential subjects (specimens, records) does not match the range(s) selected, please specify in the text box.

- ☐ 0-17
- ☐ 18-24
- ☐ 25-34
- ☑ 35-44

- [x] 45-54
- [x] 55-64
- [x] 65-74
- [x] 75+

**12.3 Gender:**

- [x] Male
- [x] Female
- [x] Other

**12.4 Special categories, check all that apply**

- [ ] Minors /Children
- [ ] Students
- [ ] Employees - Civilian
- [ ] Employees - Contractor
- [ ] Resident/trainee
- [ ] Cadets /Midshipmen
- [x] Active Duty Military Personnel
- [ ] Wounded Warriors
- [ ] Economically Disadvantaged Persons
- [ ] Educationally Disadvantaged Persons
- [ ] Physically Challenged (Physical challenges include visual and/or auditory impairment)
- [ ] Persons with Impaired Decisional Capacity
- [ ] Prisoners
- [ ] Pregnant Women, Fetuses, and Neonates
- [ ] Non-English Speakers
- [ ] International Research involving Foreign Nationals - Headquarters Review is necessary

You must also consider the requirements of DoDI 3216.02, Enclosure 3, paragraph 7.e.

**12.5 Inclusion Criteria:**

| Order Number | Criteria |
|---|---|
| 1 | • Active duty and DoD beneficiaries aged 30 years or older undergoing cataract surgery<br>• Corneal astigmatism = 1.0 D and a surgical plan that includes a toric intraocular lens for astigmatism correction.<br>  ○ The lenses used will be the Tecnis Toric II IOL and the Eyhance Toric II IOL (Johnson & Johnson Vision). The lenses will be used on label.<br>• No observed zonular or capsular problems prior to, or at the time of, capsular tension ring insertion |

**12.6 Exclusion Criteria:**

| Order Number | Criteria |
|---|---|
| | • Patients who are pregnant or lactating |

| | |
|---|---|
| 1 | • Patients undergoing cataract surgery who do not have corneal astigmatism =1.0 D.<br>• Any observed zonular or capsular problems prior to, or at the time of, capsular tension ring insertion.<br>• Pre-existing ocular conditions, including:<br>  ○ Pseudoexfoliation syndrome in one or both eyes<br>  ○ Prior incisional ocular surgery<br>  ○ Lens subluxation<br>  ○ Poor dilation or inability to position at the slit lamp (making postoperative outcome measurements difficult or impossible)<br>  ○ Plans for extensive travel or to move away during the postoperative evaluation period<br>  ○ Other conditions that would influence the capsule or lens positioning<br>• Surgical plan that includes other procedures at the time of initial cataract surgery, such as Limbal Relaxing Incisions (LRIs), Micro-Incisional Glaucoma Surgery (MIGS), etc.<br>• Legally Authorized Representatives will not be utilized in this study |

## 13.0 Recruitment and Consent

**13.1 Please describe the recruitment process, including how subjects will be identified and selected for the study.**

Providers will ask their patients if they are interested in being referred to the research department. If the subject agrees, the provider will provide the research department their name and phone number and/or give the patients the contact information for the research department. We will also post advertisements around the hospital. Some patients may be patients of the PI or AI; however, they will have another study staff recruit their patients to prevent any misconception of coercion or undue influence.

**13.2 Compensation for Participation:**

Subjects will not be paid for their participation.

**13.3 Please describe the pre-screening process. If no pre-screening, enter Not Applicable in the text editor**

N/A

**13.4 Consent Process: Revised Common Rule, Section 219.116: General requirements for informed consent, whether written or oral, are set forth in this paragraph and apply to consent obtained in accordance with the requirements set forth in paragraphs (b) through (d) of this section. Broad consent may be obtained in lieu of informed consent obtained in accordance with paragraphs (b) and (c) of this section only with respect to the storage, maintenance, and secondary research uses of identifiable private information and identifiable biospecimens.**

Are you requesting a waiver or alteration of informed consent?

○ Yes ◉ No

Please explain the consent process:

Informed Consent and HIPAA Authorization will be sought in advance of any screening and study-related procedures from each prospective study subject and appropriately documented in accordance with 32 CFR 219.117. The subject may decline to consent without prejudice. At the subjects' discretion, they may take the ICD home to discuss further with family members or another physician prior to making a decision. If the subject consents, a copy of the signed ICD and HIPAA Authorization Document will be given to the subject.

**13.5 DoDI 3216.02 requires an ombudsman to be present during recruitment briefings when research involves greater than minimal risk and recruitment of Service members occurs in a group setting. If applicable, you may nominate an individual to serve as the ombudsman.**

- (•) N/A
- ( ) Propose ombudsman

**13.6 Withdrawal from Study Participation:**

Explain the process for withdrawal and specify whether or not the subjects will be given the opportunity to withdraw their data their data/specimens in the event they wish to withdraw from the study

If a participant first agrees to participate and then changes their mind, they are free to withdraw consent and discontinue participation at any time. Their decision will not affect their ability to receive medical care and will not be penalized or lose any benefits to which they would otherwise be entitled. There are no risks from withdrawing. They will be advised in the Informed Consent process that if they decide to withdraw from the study early, we will ask them to discuss their decision with the study staff. The researcher may withdraw them from the study prior to the study's end without their consent for one or more of the following reasons: Failure to follow the instructions of the researchers and study staff. The researcher decides that continuing their participation is not in their best interests. The study is cancelled. Other administrative reasons. Unanticipated circumstances. They become Pregnant or begin lactating. If they lose their status as a military health care beneficiary, they can no longer be included in the study.

Patients will be discontinued from the study if intraoperative complications or concerns are noted PRIOR to capsular tension ring insertion.
Intraoperative complications may include:

- capsular bag tears or rents
- anterior vitrectomy
- phacodonesis
- damaged zonules
- use of non-toric intraocular lens
- other intraoperative complications that would influence capsule or lens positioning or stability

Patients will continue to be enrolled in the study to further characterize the safety of the investigational device and treatment if intraoperative complications occur DURING OR AFTER the point of possible capsular tension ring insertion. This includes secondary surgical interventions such as repositioning of the IOL. These eyes will not be included in the data analysis after this point.

## 14.0 Risks and Benefits

**14.1 Risks of Harm:**

Identify all research-related risks of harm to which the subject will be exposed for each research procedure or intervention as a result of participation in this study. Consider the risks of breach of confidentiality, psychological, legal, social, and economic risks as well as physical risks. Do not describe risks from standard care procedures; only describe risks from procedures done for research purposes

The risks listed below are inherent in cataract surgery, the use of a toric intraocular lens, and the use of a capsular tension device.

**More common and not serious::**

- Blurry vision
- Photosensitivity (light sensitivity)
- Posterior capsular opacity

**Less common** and **more serious**:

- Intraocular inflammation
- Elevated intraocular pressure
- Capsular tears
- Iris tears or atrophy
- Intraocular floppy iris syndrome (IFIS)
- Vitreous problems
- Floaters
- Dropped lens
- Decentered intraocular lens
- Cortical remnants
- Optic atrophy
- Deposits on intraocular lens
- Posterior synechiae
- Glaucoma
- Iridodonesis
- Phacodonesis
- Corneal edema
- Fibrin in pupil
- Cystoid macular edema (retinal swelling)
- Need for additional surgery
- Aphakia
- Retinal tears or detachment
- Loss of vision
- Anterior vitrectomy
- Dropped lens
- Rotated lens
- Need for spectacle correction
- Astigmatism
- Accidental breach of confidentiality.

A specific risk inherent to the capsular tension ring device is that it is also possible that the capsular tension ring could be placed incorrectly into the wrong part of the eye (sulcus or anterior chamber), which may lead to damage to the surrounding structures.

**14.2 Measures to Minimize Risks of Harm (Precautions, safeguards):**

For each research procedure or intervention, describe all measures to minimize and/or eliminate risk of harms to subjects and study personnel

The treatment intervention involves placement of a capsular tension ring. Risks will be minimized by the surgeons being experienced with capsular tension ring placement and techniques. Risks will also be minimized by excluding patients with any conditions such as pseudoexfoliation, capsular tears, or other surgical complications. If at any time one of the patients experiences a complication, the surgeon will address it surgically or during the postoperative period, depending on the treatment required.

If at any time the patient reports a side effect, they will be referred to one of the Investigators for care.

**14.3 Confidentiality Protections (for research records, data and/or specimens):**

Describe in detail the plan to maintain confidentiality of the research data, specimens, and records throughout the study and at its conclusion (e.g., destruction, long term storage, or banking). Explain the plan for securing the data (e.g., use of passwords, encryption, secure servers, firewalls, and other appropriate methods). If data will be shared electronically with other team members/collaborators outside the institution, describe the method of transmission and safeguards to maintain confidentiality. Explain whether this study may collect information that State or Federal law requires to be reported to other officials or ethically requires action, e. g., child or spouse abuse

During the study, the Informed Consents, HIPAA Authorization Documents, source documents, participant registration documents, identifiable Master Key, and any other study documents utilized during the study will be stored in a locked cabinet or electronically on a CAC-enabled government computer and password protected.

Medical records will be annotated with ICD-10 code Z00.6 to reflect the subjects' participation in a research study, in which they are receiving a research-related treatment intervention.

Long-term storage: When the IRB Study Closure Letter has been obtained from the IRB, the Informed Consents, HIPAA Authorization Documents, source documents, participant registration documents, identifiable Master Key, and any other study documents utilized during the study will be scanned into a CAC-enabled government computer and electronically maintained for a minimum of 6 years.

For subjects who consent to have their coded research data placed in the "Mike O'Callaghan Military Medical Center General Research Data Repository" (FWH20180064E), the coded data will be retained for future use. The coded research data will not be utilized for further research activity beyond the protocol stipulations without additional IRB approval.

**14.4 Potential Benefits:**

Describe any real and potential benefits of the research to the subject and any potential benefits to a specific community or society

If the individuals in the research are considered experimental subjects (per 10 USC 980), and they cannot provide their own consent, the protocol must describe the intent to directly benefit all subjects

Eyes treated with capsular tension rings may experience less risk of the toric lens rotating out of its intended alignment. This would lead to an improvement in refractive outcome and may reduce their dependence on glasses postoperatively. They may also have a reduced risk of undergoing a second surgery to adjust the position of the toric intraocular lens. None of these benefits are guaranteed.

**14.5 Privacy for Subjects:**

Describe the measures to protect subject's privacy during recruitment, the consent process, and all research activities, etc.

During the study, the research consents, HIPAA Authorization Documents, participant registration forms, identifiable Master Key, and any other study documents utilized during the study will be stored in a locked cabinet or electronically on a CAC-enabled government computer and password protected.

**14.6 Incidental or Unexpected Findings:**

Describe the plan to address incidental findings and unexpected findings about individuals from screening to the end of the subject's participation in the research. In cases where the subject could possibly benefit medically or otherwise from the information, state whether or not the results of screening, research participation, research tests, etc., will be shared with subjects or their primary care provider. State whether the researcher is obligated or mandated to report results to appropriate military or civilian authorities and explain the potential impact on the subject

If significant new findings develop during the course of this study that may relate to subjects' decision to continue to participate in the study, they will be informed and/or their PCM will be notified.

## 15.0 Study Monitoring

**15.1 Your study requires either Data and Safety Monitoring Plan (DSMP) or a Data and Safety Monitoring Board (DSMB).**

- ○ DSMP
- ○ DSMB
- ○ Both
- ◉ Not Applicable

## 16.0 Reportable Events

**16.1 Reportable Events: Consult with the research office at your institution to ensure requirements are met. Describe plans for reporting unexpected adverse events and unanticipated problems. Address how unexpected adverse events will be identified, who will report, how often adverse events and unanticipated problems will be reviewed to determine if any changes to the protocol or consent form are needed and the scale that will be used to grade the severity of the adverse event.**

Consult with the research office at your institution to ensure requirements are met

• Describe plans for reporting expected adverse events. Identify what the expected adverse events will be for this study, describe the likelihood (frequency, severity, reversibility, short-term management and any long-term implications of each expected event)

• Describe plans for reporting unexpected adverse events and unanticipated problems. Address how unexpected adverse events will be identified, who will report, how often adverse events and unanticipated problems will be reviewed to determine if any changes to the research protocol or consent form are needed and the scale that will be used to grade the severity of the adverse event

A. Adverse Events (AEs) are defined as "any untoward medical or surgical occurrence in the study eye, which does not necessarily have a causal relationship with the trial intervention." AEs will be assessed at all visits and during the surgical procedure. AEs will be assessed using all available clinical modalities, including but not limited to: patient history, slit lamp examination, intra-operative observation, and ancillary clinical testing such as Optical Coherence Tomography (OCT), visual corneal topography, refraction, etc.
B. All AEs and Unanticipated Adverse Effects will be documented and records maintained, regardless of whether thought to be device-related, procedure/operation-related, or not.
C. Adverse Event: The investigator(s) on this protocol will complete an Adverse Event Reporting Form (also referred to as a Case Report Form) for each AE. The form will be reviewed by the Research Monitor and submitted to the governing IRB and FDA as consistent with all required policies.
D. Serious Adverse Event: An adverse event where the outcome is one of the following:

-Death

-Life-threatening, where the patient was at substantial risk of dying or continued use of the product might have resulted in death
-Hospitalization or prolongation of an existing hospitalization
-Disability or permanent damage, interfering with the patient's ability to conduct normal life functions
-Congenital anomaly or birth defect
-Required intervention to prevent permanent impairment

E. Unanticipated Adverse Device Effect: An effect not outlined in study documents or an event that occurs more often than expected. Required policies as outlined in 21 CFR 812.150 (a1) (b) involve submitting unanticipated adverse device effects to the FDA and IRB, with investigators required to submit the unanticipated ADE report less than or equal to working days of their own notification. Investigators may be required by the FDA to submit follow-up reports regarding an UADE. In the case of this proposed study, "The Investigation of Capsular Tension Rings in Intraocular Lens Rotation," the sponsor is the investigator, eliminating one of the reporting steps. An AE may be reclassified as an UADE in the event the effect is revealed to be more frequent than expected.
F. Descriptions and Definitions of AEs:

-Relationship to device: definite, probably, possible, unlikely, etc.
-Relationship of event to implantation procedure or operation: definite, probably, possible, unlikely, etc.
-Severity of the event: mild, moderate, severe, vision-threatening, lifethreatening, etc.
-Subsequent treatments or interventions required: none, medical therapy, surgical or procedural intervention, hospitalization, etc.
-Resolution status: resolved without sequalae, resolved with chronic sequelae, ongoing without sequelae, ongoing with sequelae, etc.

Withdrawal of subjects due to adverse events: Patients will be discontinued from the study if any intraoperative complications or adverse events are noted prior to capsular tension ring insertion. Intraoperative complications may include capsular bag tears or rents, anterior vitrectomy, phacodonesis, damaged zonules, use of non-toric lens, or other intraoperative complications that would influence capsular bag or lens positioning or stability.

If intraoperative complications or adverse events occur after the point of possible capsular tension ring insertion, the patient will continue to be enrolled in the study to further characterize the safety of the investigational device and treatment. Complete and thorough pre-, intra-, and post-operative care will be provided for all patients regardless of enrollment status in the study. All patients, including patients who experience an adverse event, will continue in the study and receive appropriate treatment and/or monitoring throughout the duration required based on their clinical needs, regardless of whether the study eye is discontinued or an adverse event occurs.

## 17.0 Equipment/non-FDA Regulated Devices

**17.1 Does the study involve the use of any unique non-medical devices/equipment?**

○ Yes ◉ No

## 18.0 FDA-Regulated Products

**18.1 Will any drugs, dietary supplements, biologics, or devices be utilized in this study?**

☐ Drugs
☐ Dietary Supplements
☐ Biologics
☑ Devices
☐ N/A

**18.3 Device Details:**

☐ Are device(s) in this research being used in accordance to the approved labeling?
☑ Are device(s) in this research being used in a manner other than its approved labeling?

When adding a device indicate in the details section of the device if the use is either used in accordance to the approved labeling or in a manner other than it's approved labeling

| View Details | Device Name |
|---|---|
| ⊟ | MORCHER® capsular tension ring |

| | |
|---|---|
| Manufacturer/Supplier of Device | MORCHER® EYEJET® CTR Types 14, 14A, and 14C |
| Where will the Devices Be Stored | stored separately from clinic stock and labeled in accordance with FDA Investigational Device Exemption (IDE# G190139) |
| Will Devices be supplied at no Cost | Yes |
| Is this a HUD (HDE) | No |
| HDE Number | |
| Who holds the IDE | N/A |
| IDE details | FDA approved Investigational Device Exemption (IDE# G190139) |

## 18.4 Reporting Requirements for FDA-regulated research under IND and IDE:

Describe the process for complying with FDA regulatory requirements for adverse event reporting and adverse device effects reporting to the sponsor

1. Adverse Events (AEs) are defined as "any untoward medical or surgical occurrence in the study eye, which does not necessarily have a causal relationship with the trial intervention." AEs will be assessed at all visits and during the surgical procedure. AEs will be assessed using all available clinical modalities, including but not limited to: patient history, slit lamp examination, intra-operative observation, and ancillary clinical testing such as Optical Coherence Tomography (OCT), visual corneal topography, refraction, etc.
2. All AEs and Unanticipated Adverse Effects will be documented and records maintained, regardless of whether thought to be device-related, procedure/operation-related, or not.
3. Adverse Event: The investigator(s) on this protocol will complete an Adverse Event Reporting Form (also referred to as a Case Report Form) for each AE. The form will be reviewed by the Research Monitor and submitted to the governing IRB and FDA as consistent with all required policies.
4. Serious Adverse Event: An adverse event where the outcome is one of the following:

    1. Death
    2. Life-threatening, where the patient was at substantial risk of dying or continued use of the product might have resulted in death
    3. Hospitalization or prolongation of an existing hospitalization
    4. Disability or permanent damage, interfering with the patient's ability to conduct normal life functions
    5. Congenital anomaly or birth defect
    6. Required intervention to prevent permanent impairment

5. Unanticipated Adverse Device Effect: An effect not outlined in study documents or an event that occurs more often than expected. Required policies as outlined in 21 CFR 812.150 (a1) (b) involve submitting unanticipated adverse device effects to the FDA and IRB, with investigators required to submit the unanticipated ADE report less than or equal to 10 working days of their own notification. Investigators may be required by the FDA to submit follow-up reports regarding an UADE. In the case of this proposed study, "The Investigation of Capsular Tension Rings in Intraocular Lens Rotation," the sponsor is the investigator, eliminating one of the reporting steps. An AE may be reclassified as an UADE in the event the effect is revealed to be more frequent than expected.
6. Descriptions and Definitions of AEs:

a. Relationship to device: definite, probably, possible, unlikely, etc.
b. Relationship of event to implantation procedure or operation: definite, probably, possible, unlikely, etc.
c. Severity of the event: mild, moderate, severe, vision-threatening, life-threatening, etc.
d. Subsequent treatments or interventions required: none, medical therapy, surgical or procedural intervention, hospitalization, etc.

Resolution status: resolved without sequelae, resolved with chronic sequelae, ongoing without sequelae, ongoing with sequelae, etc.

**18.5 Sponsor (organization/institution/company):**

☑ N/A

If applicable, provide sponsor contact information:

## 19.0 Research Registration Requirements

**19.1 ClinicalTrials.gov Registration:**

○ Registration is not required
○ Registration pending
◉ Registration complete

"NCT" number:

NCT04436198

**19.2 Defense Technical Information Center Registration (Optional):**

◉ Registration is not required
○ Registration pending
○ Registration complete

## 20.0 References and Glossary

**20.1 References:**


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See Data Analysis Section 4 for Remaining References
12. Faul F, Erdfelder E, Lang A-G, Buchner A. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods. 2007; 39 (2): 175-191.
13. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. 2016 URL http://www.R-project.org/.

**20.2 Abbreviations and Acronyms:**