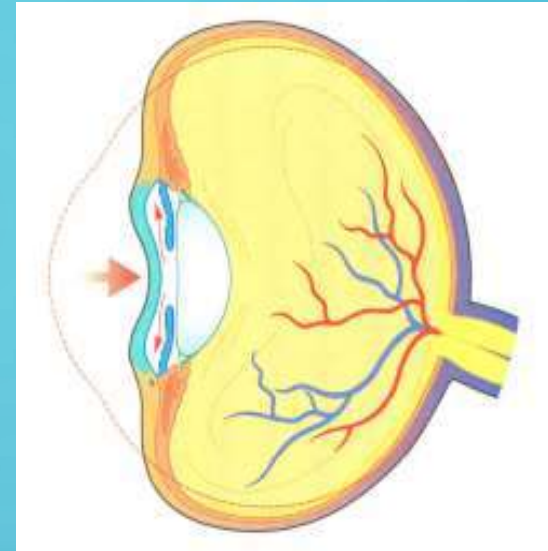




ANT SEGMENT TRAUMA

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SCIENCES



- Contusive injury of the globe leads to deformation of the cornea and subsequent equatorial expansion of the globe. Aqueous is simultaneously forced into the periphery of the anterior chamber.

- ***TRAUMATIC MYDRIASIS AND SPASM OF ACCOMMODATION:***

- Symptoms include eye pain, tearing, photophobia, discomfort when reading, and ocular fatigue. The pupil is characteristically muddled and poorly reactive to light with no relative afferent pupillary defect.
 - Interestingly, severe closed globe injuries first result in a transient miosis, followed by a longlasting partial mydriasis with poor pupillary reaction. The ciliary body often develops painful spasm of accommodation.
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- ***Diagnosis and treatment:***

If traumatic mydriasis is the only lesion present, a large round pupil will be identified, whereas if iris sphincter tears are present there may be a 'D'-shaped margin, shallow indentations, or tears extending the length of the iris.

Cycloplegics paralyze the ciliary muscle, thereby preventing spasm and relieving pain.

Treatment is typically not needed outside the acute phase.





The prognosis of traumatic mydriasis and accommodative paralysis is generally good.

While the problems with pupillary dilation and accommodation are often *transient*, a small but significant percentage of patients will experience lasting dilation and mild visual effects from accommodative paralysis.



TRAUMATIC IRITIS:

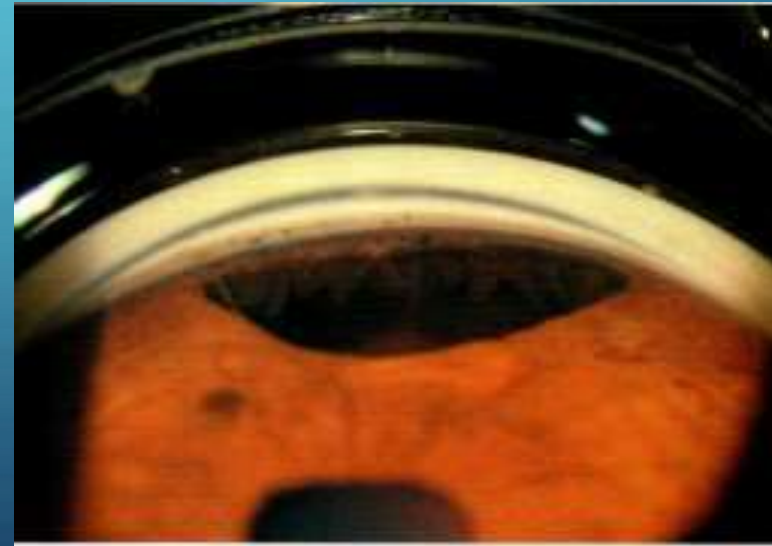
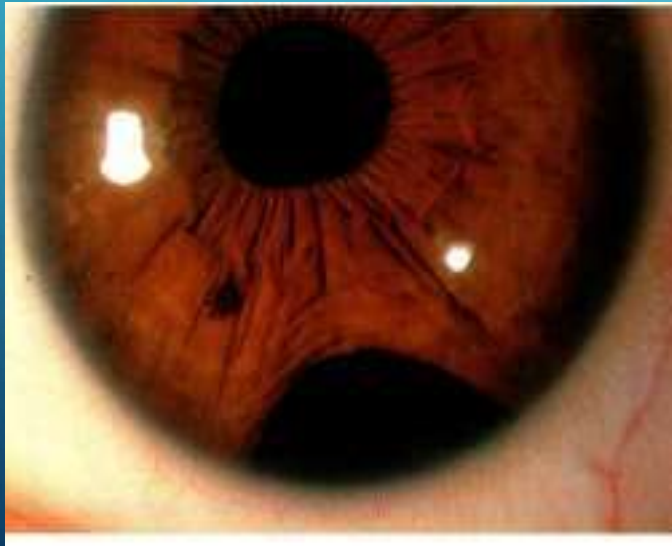
- Symptoms are similar to other forms of iritis and include pain, photophobia, and mildly decreased vision.
- The intraocular pressure (IOP) is often lower in the injured eye due to ciliary body dysfunction, although elevated IOP can occur. The classic slit lamp finding is anterior chamber cells and flare.
- Traumatic iritis is often seen in conjunction with traumatic mydriasis and spasm of accommodation.



• Iridodialysis:

- Iridodialysis is the shearing of the iris from the ciliary body at the iris root. The iris is thinner at this point, and more susceptible to injury.
 - Iridodialysis may appear as a small, crescent-shaped black area in the anterior chamber periphery
 - Gonioscopy is necessary to differentiate iridodialysis from the more serious cyclodialysis
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- A gap between the sclera and the ciliary body, with widening of the suprachoroidal space, is present in the gonioscopic view of cyclodialysis. In iridodialysis, the iris is separated at its root



- ***The indications for surgical repair include:***

- 1. refractory monocular diplopia
 - 2. debilitating glare
 - 3. repair in conjunction with other planned anterior segment surgery
 - 4. cosmesis
 - 5. subtotal iridodialysis
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ANGLE RECESSION

- contusive trauma if severe enough to cause hyphema, is highly correlated with angle recession. only a small percentage of patients will go on to develop glaucoma.
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- The silent nature of the condition underlies the importance of longitudinal follow-up after severe contusive ocular trauma

- **Pathophysiology:**

- Aqueous forced into the periphery of the anterior chamber angle can create a split in the ciliary body.
 - The longitudinal muscle of the ciliary body remains attached to the scleral spur while the circular muscle of the ciliary body and the iris root are forcefully separated.
 - This leads to a deepening and widening of the anterior chamber angle
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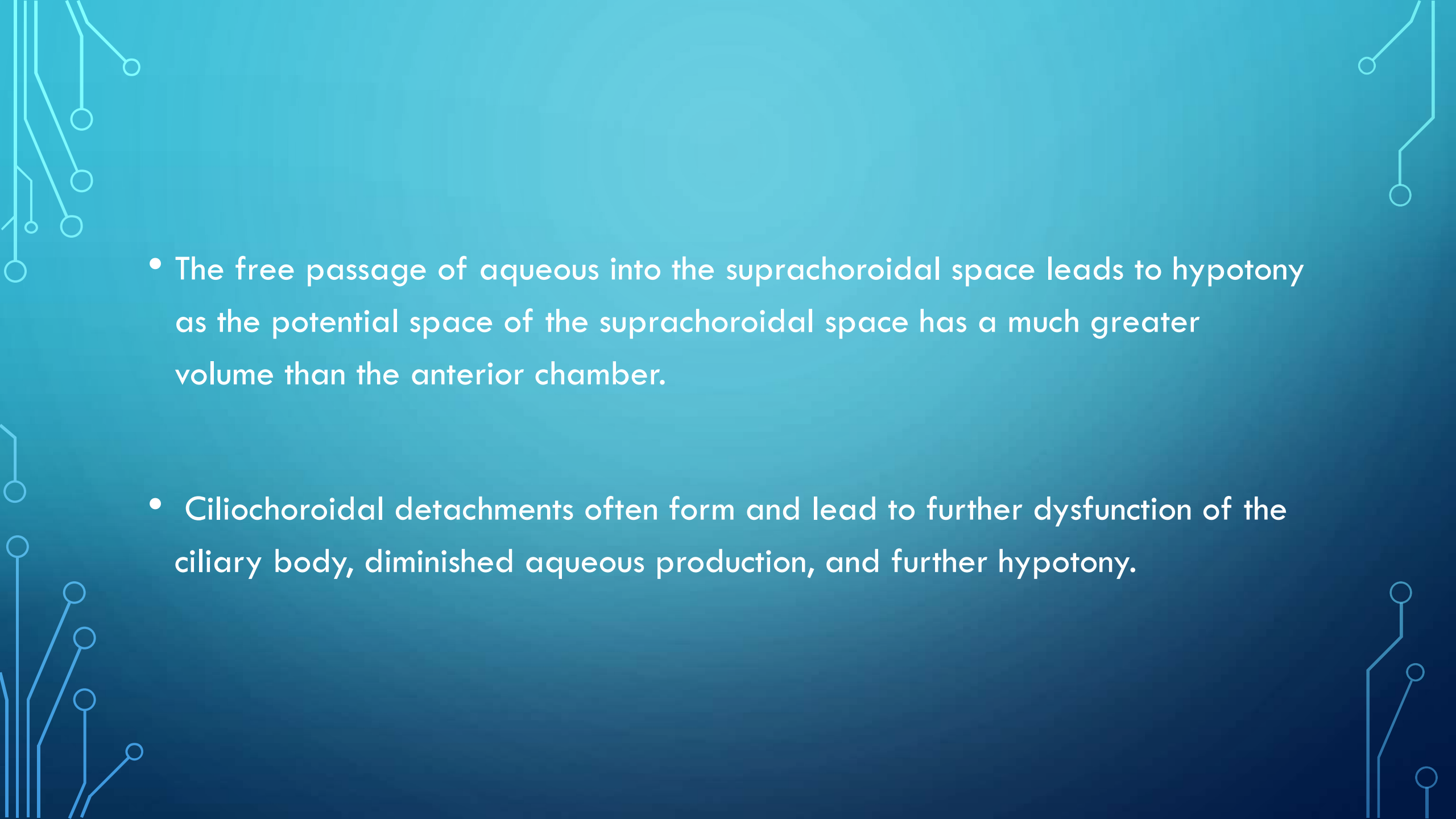
- The development of glaucoma associated with angle recession is not fully understood. Scarring of the trabecular meshwork, loss of intertrabecular spaces, and scarring of Schlemm's canal results in decreased aqueous outflow.
- The greater the portion of angle involved, the greater the subsequent risk of glaucoma. Glaucoma rarely develops if less than 180 degrees of angle is involved.



- Subtle changes include disruption of the iris processes from their insertion into the scleral spur and ciliary body leaving the ciliary body more exposed.
- In more severe injuries, the degree of angle recession may be larger and manifest as a widened ciliary body band and a more prominent scleral spur
- Approximately 6-8% of patients with angle recession will ultimately develop glaucoma

CYCLODIALYSIS

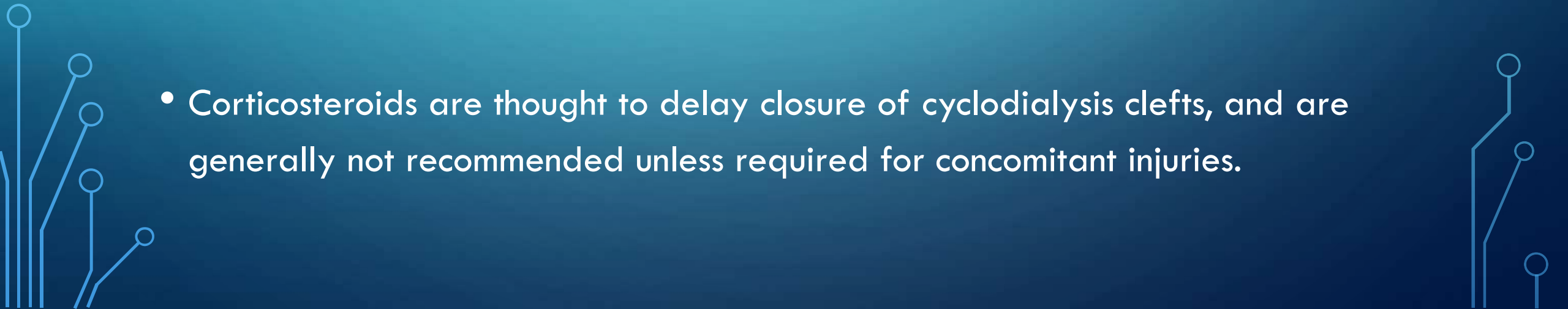
- A cyclodialysis cleft forms when a portion of the ciliary body is disinserted from the sclera, allowing free passage of aqueous into the suprachoroidal space .
- Traumatic cyclodialysis is an uncommon condition and can sometimes be difficult to diagnose.
- Severe hypotony is the hallmark of the condition and can lead to corneal failure and eventually phthisis bulbi if left untreated.

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- The background is a solid blue gradient. In the corners, there are decorative white line art elements resembling circuit boards or neural networks, with lines and small circles connecting them.
- The free passage of aqueous into the suprachoroidal space leads to hypotony as the potential space of the suprachoroidal space has a much greater volume than the anterior chamber.
 - Ciliochoroidal detachments often form and lead to further dysfunction of the ciliary body, diminished aqueous production, and further hypotony.

DIAGNOSIS AND TREATMENT

- Blurred vision with a refractive shift may be present due to anterior displacement of the lens-iris diaphragm
- Hypotony, often profound
- Anterior chamber signs :corneal edema, shallowing of the anterior chamber, mydriasis, and a peaked pupil near the cyclodialysis site.
- If hypotony is persistent, optic disc edema, retinal vessel tortuosity, and retinal and choroidal folds are often seen.

- Many cyclodialyses can be visualized with gonioscopy and appear as a gap between the sclera and the ciliary body.
- Ultrasound biomicroscopy offers promise in diagnosing occult cyclodialyses, especially when the view is obscured by hemorrhage or corneal edema.
- cyclodialysis clefts become increasingly difficult to visualize as time passes, as peripheral anterior synechiae form and obscure the anterior chamber angle

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- Observation or medical therapy with cycloplegics is initially attempted, but further treatment is often required to definitively close the cleft.
 - Atropine is used initially to maintain anatomic proximity of the ciliary body and scleral spur, thereby encouraging closure of the cleft.
 - Corticosteroids are thought to delay closure of cyclodialysis clefts, and are generally not recommended unless required for concomitant injuries.
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- Argon laser applied to the cyclodialysis cleft has now become the first line of therapy **if medical management does not achieve success in the first 4-6 weeks.** Laser is applied to the ciliary body and scleral sides of the cleft.

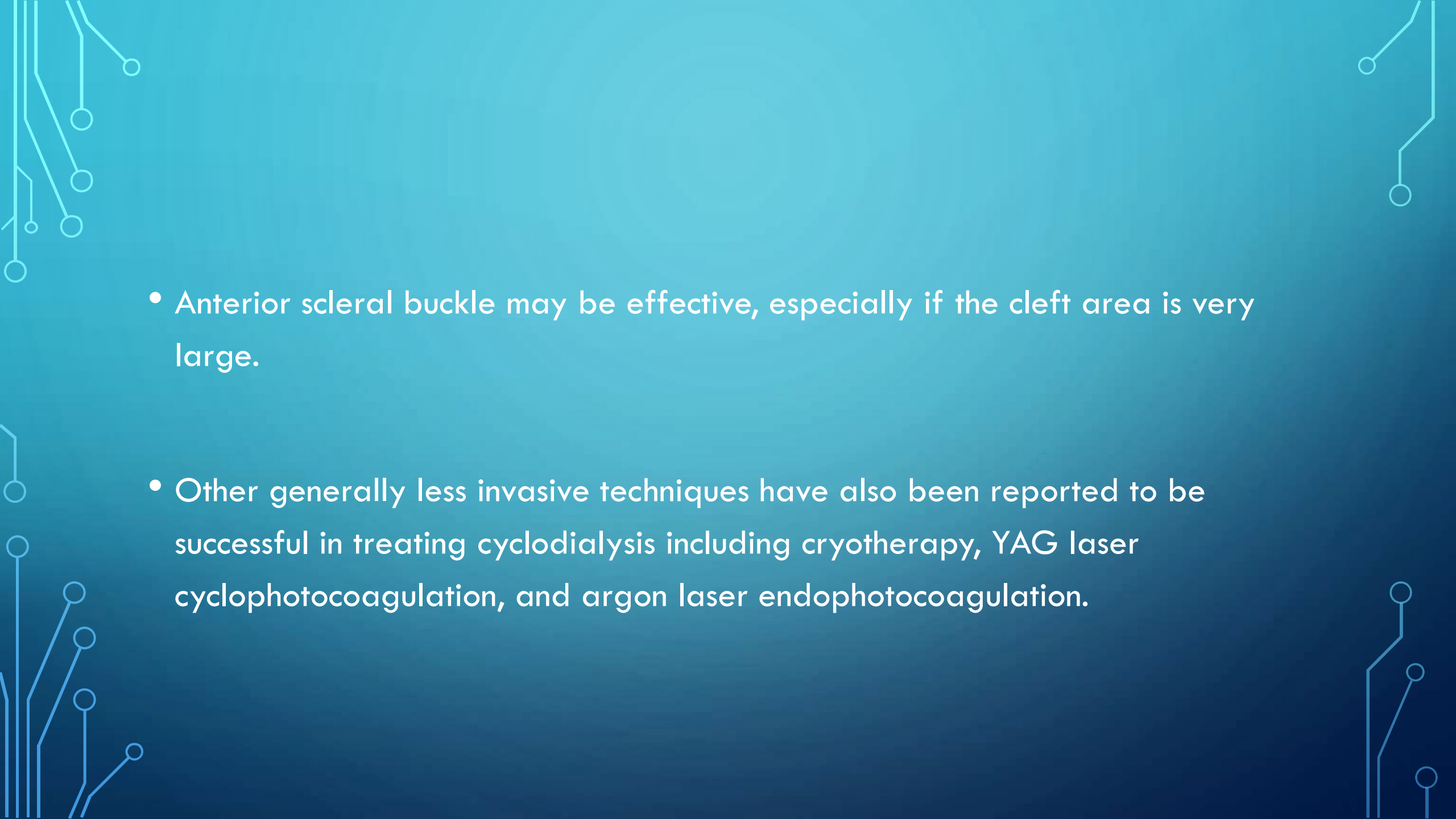
Recommended settings are:

- 1. duration of 0.1 second
- 2. 50-100 micron spot size
- 3. 500-1500 mW power
- 4. approximately 100 applications.
- Atropine is continued after treatment.

- If the initial treatment is unsuccessful, repeat treatments often will close the cyclodialysis cleft.
- If the anterior chamber is relatively flat, obscuring the view of cyclodialysis clefts, viscoelastic injection into the anterior chamber is helpful in deepening the anterior chamber and exposing the cleft for laser therapy

- Although many cyclodialysis clefts respond to laser treatment, invasive surgical treatments are recommended if argon laser therapy fails. The classic treatment of **diathermy** remains a reasonable **second-line therapy**:

pupillary dilation in conjunction with diathermy applied to the cyclodialysis cleft, followed by drainage of suprachoroidal effusions through incisions in the sclera. Flattening the communication with the suprachoroidal space would often lead to reattachment of the ciliary body and restoration of function.

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- Anterior scleral buckle may be effective, especially if the cleft area is very large.
 - Other generally less invasive techniques have also been reported to be successful in treating cyclodialysis including cryotherapy, YAG laser cyclophotocoagulation, and argon laser endophotocoagulation.

LENS INJURY:

- Lens injuries have been reported to occur in 7- 50% of eyes sustaining significant trauma.
- While initial trauma to the lens may appear insignificant, delayed sequelae may present days to months after the initial incident.

- **Lens subluxation and dislocation** (immediate to delayed) :

- Lenticular subluxation is not always evident with the traditional slit lamp examination. For example, an inferior zonular disruption may not be evident unless the patient is in a supine position.

- If zonular disruption is incomplete, the lens is typically drawn away from the site of the zonular rupture by the intact zonules. The anterior chamber is often asymmetrically deep in this setting.
- B-scan ultrasound or ultrasound biomicroscopy may aid in localization of the lens in eyes with a suboptimal view of the anterior chamber.

- **Symptoms** from a subluxated crystalline lens correlate with the degree of subluxation and cataract formation.
- The lens creates **astigmatism** when it is displaced from its normal anatomic location.
- Increasing amounts of zonular disruption result in progressive spherical shape and secondary **myopic lens changes**.
- **Monocular diplopia** is induced if the lens margin splits the visual axis.

- Symptoms may also be minimized with miotics to prevent pupillary dilation. Medical management of subluxated or dislocated lenses is often preferable to surgical options
- Severely subluxated lenses with vitreous prolapse are often referred to vitreoretinal specialists for pars plana vitrectomy and lensectomy.
- With milder degrees of subluxation, the use of capsular hooks and/or capsular tension rings can stabilize the lens for phaco.
- ICCE

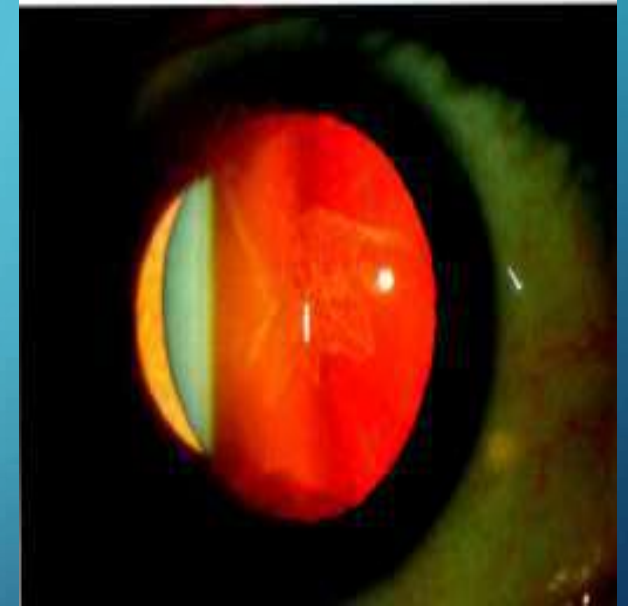
- **Traumatic cataract :**

- **Penetrating trauma:**

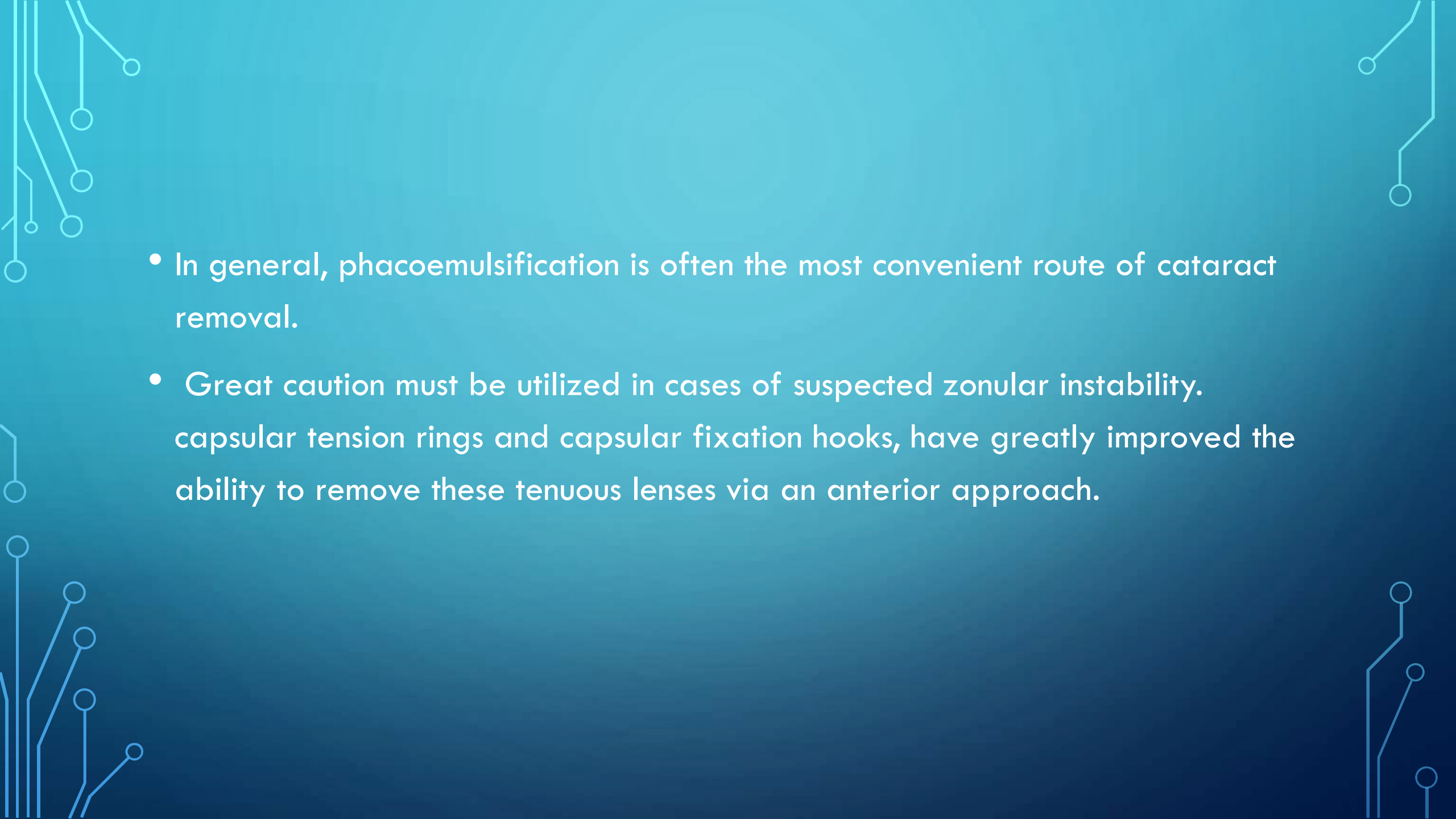
- Linear v/s mature cataract

- **Blunt trauma:**

- Anterior or posterior rosette , slowly progressive



- If the cataract is not significantly dense or does not involve the central visual axis, patients may experience relatively few symptoms.
- The location of the cataract within the lens itself also plays a role with respect to symptomatology. Posterior subcapsular cataracts generally produce more symptoms than nuclear sclerotic or cortical cataracts of comparable density.

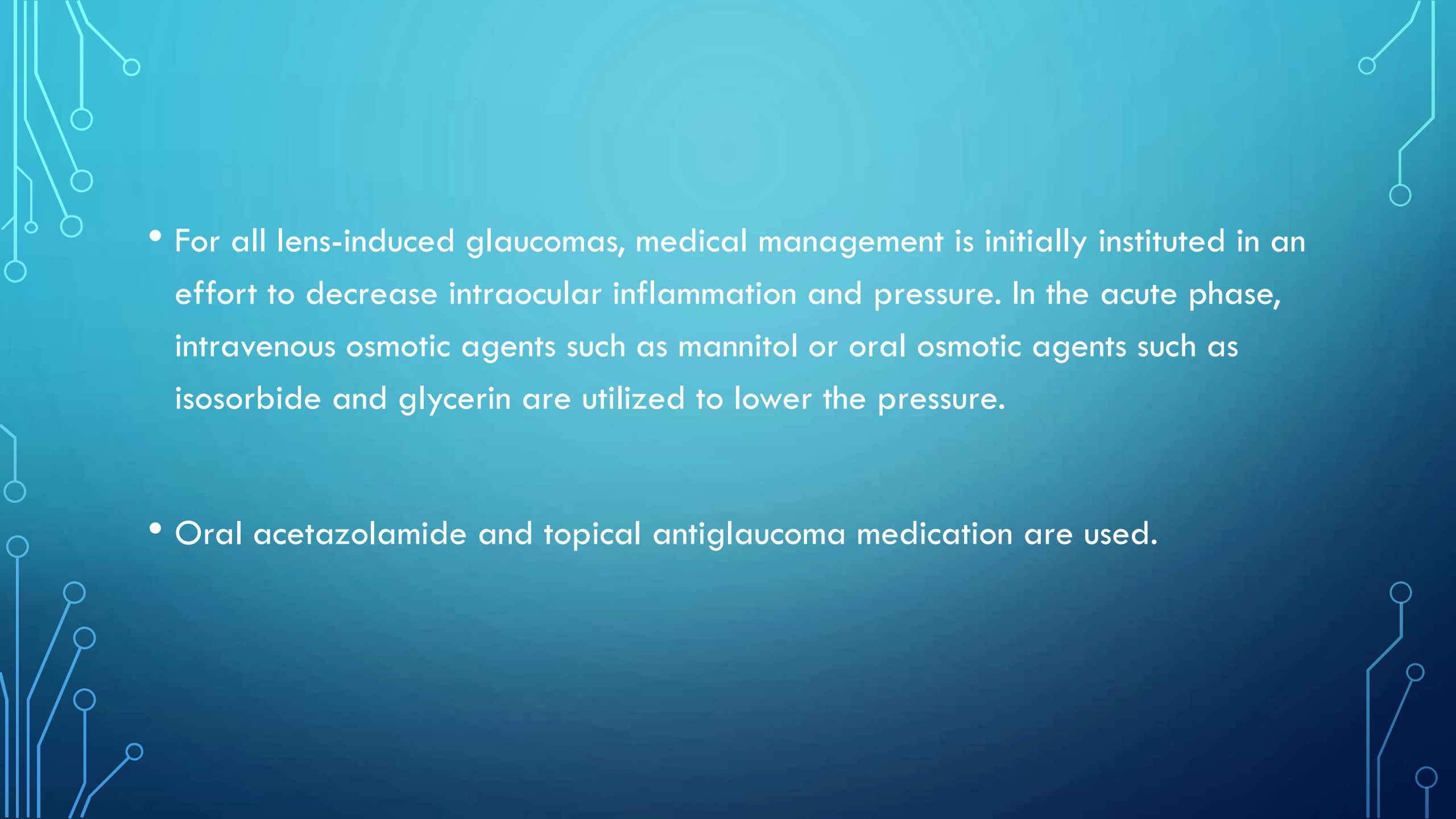
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- The slide features a dark blue gradient background. In the corners, there are decorative white line art elements resembling circuit boards or neural networks, with lines connecting to small circles.
- In general, phacoemulsification is often the most convenient route of cataract removal.
 - Great caution must be utilized in cases of suspected zonular instability. capsular tension rings and capsular fixation hooks, have greatly improved the ability to remove these tenuous lenses via an anterior approach.

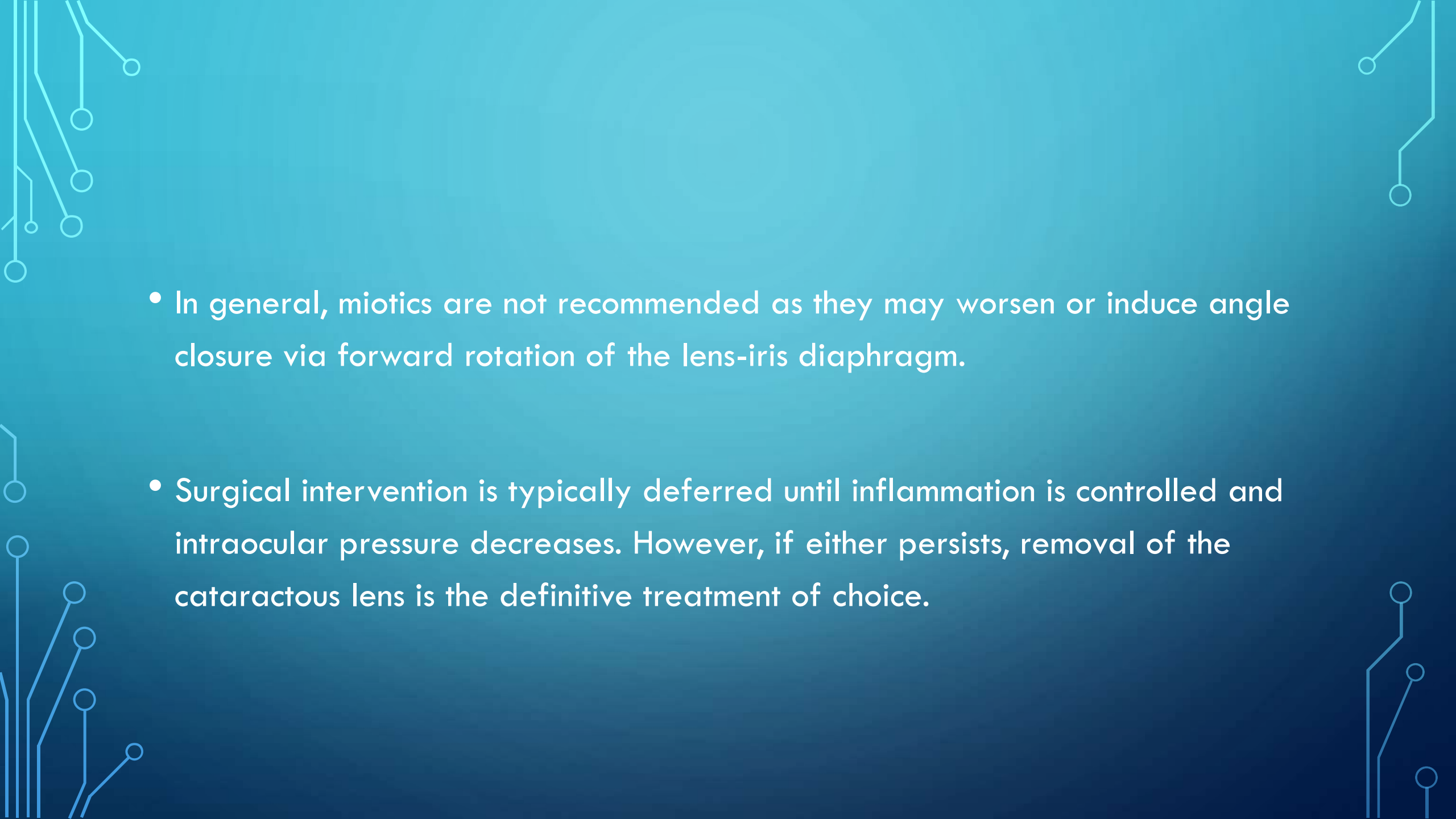
- Primary intraocular lens implantation may be considered after any method of cataract extraction **if inflammation is well controlled** and the risk of infection is deemed to be low.
- If **pediatric cataract extraction** is undertaken:
- One concern is the propensity for children to develop **posterior capsular opacifications** relatively soon after cataract removal.
- For this reason, a primary **posterior capsulotomy and anterior vitrectomy** are recommended at the time of cataract extraction

- ***lens-induced glaucoma (days to years):***

- Specific diagnostic entities include:

- 1. **phacolytic glaucoma:** open angle, delayed onset, intact capsule
- 2. **lens particle glaucoma:** open angle, usually rapid onset, violated capsule
- 3. **phacoanaphylactic glaucoma:** open angle, variable onset, violated capsule
- 4. **phacomorphic glaucoma:** closed angle, usually delayed onset, intact or violated capsule.

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- The background is a solid blue gradient. In the corners, there are decorative white line art elements resembling circuit boards or neural networks, with lines and small circles connecting them.
- For all lens-induced glaucomas, medical management is initially instituted in an effort to decrease intraocular inflammation and pressure. In the acute phase, intravenous osmotic agents such as mannitol or oral osmotic agents such as isosorbide and glycerin are utilized to lower the pressure.
 - Oral acetazolamide and topical antiglaucoma medication are used.

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- In general, miotics are not recommended as they may worsen or induce angle closure via forward rotation of the lens-iris diaphragm.
 - Surgical intervention is typically deferred until inflammation is controlled and intraocular pressure decreases. However, if either persists, removal of the cataractous lens is the definitive treatment of choice.