

## Trephine Assisted Trabeculectomy Technique

**Idrees\***

*Al Dara Hospital and Medical Center at Riyadh, Saudi Arabia*

**\*Corresponding Author:** Dr Idrees, Al Dara Hospital and Medical Center at Riyadh, Saudi Arabia.

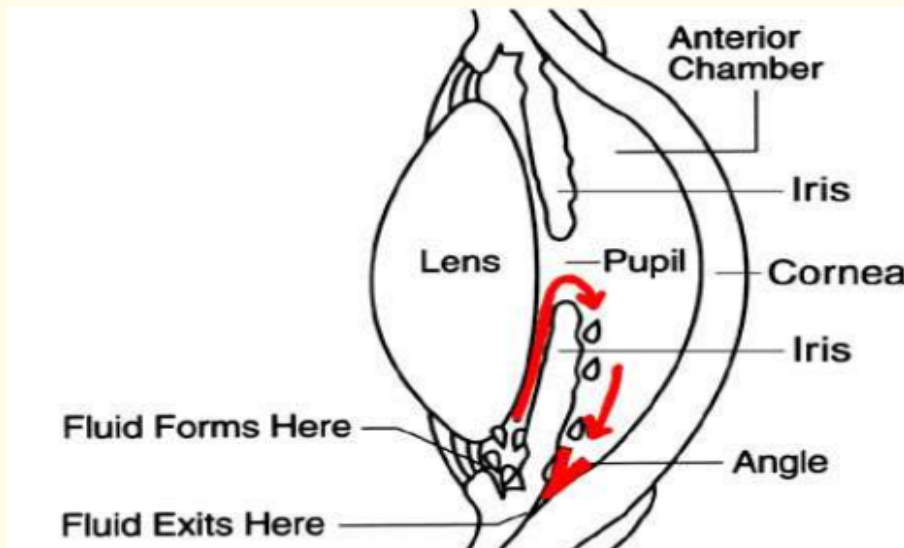
**Received:** October 18, 2016; **Published:** December 03, 2016

### Introduction

As an Ophthalmologist, we understand that Glaucoma is a silent killer of vision in most of the cases. There are many cause for the irreversible damage to the visual functions due to this disease. In most of the cases it affects the productive life of the patient adversely in terms of its social and economic implications.

Intraocular pressure is something which probably we can manipulate effectively at present. There are many approaches to this aim. The most commonly used treatment option selected by the physicians and patients is in the form of topical eye drops to either decrease the production of aqueous or to increase the outflow from the eye on in some cases both. Ideally use of intraocular pressure lowering eye drops is the most commonly selected treatment option selected by most of the eye care physicians and patients. Another option in some cases is to use laser either alone or in combination with topical eye drops.

I personally prefer Idrees Trephine Assisted Trabeculectomy as procedure of my choice at least in one eye for most of my patients in which I feel that this treatment option is going to benefit my patient for many reasons. Potential benefits and risks must be weighed and discussed with the patient in detail and should be well documented.



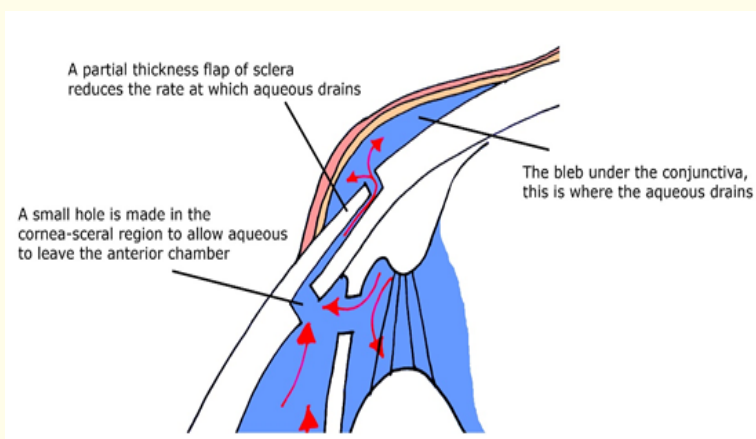
**Figure 1:** Aqueous Circulation.

The basic issue or the draw back with eye drops is that usually there is a peak of IOP lowering after instilling eye drops and followed by a gradual rise in IOP as the effect of eye drop starts wearing off. Another issue can be poor technique of instillation in the eye causing

inadequate absorption in the eye and unpredictable effect at the target site and in other cases compliance and long term cost of the treatment may pose another barrier to effectively prevent or delay loss of visual functions.

The surgical options to reduce intraocular pressure has also steadily increased with addition of more options. In my opinion still a well done trabeculectomy is probably one of the best and most reliable treatment option to provide a steady round the clock lowering of intraocular pressure on long term basis and hence offering a better chance to preserve the visual functions for the rest of the life or at least to delay the visual deterioration.

Cairns was the first to describe conventional trabeculectomy in 1968 with guarded scleral flap. The principle of the procedure is to create a fistula between the anterior chamber and subconjunctival space from where aqueous is absorbed.



**Figure 2:** The basic principle of the trabeculectomy surgery.

There are many variations of performing trabeculectomy. Each one has its own set of advantages along with risks and limitations. What I am going to describe is a little modification to make trabeculectomy easy, safe and more reliable in terms of long term IOP control with minimal risk of complications as per my own experience with this technique.

### Indications

The most common indication of this surgery in my opinion is deterioration of visual functions like decreasing vision, deteriorating visual field, uncontrolled IOP, apparently well controlled IOP with deteriorating visual functions with false sense of protection of the vision, increasing cup disc ratio, unsteady IOP control with fluctuating IOP with spike of high IOP as the effect of the eye drops wears away, poor compliance, economic cost of the topical treatment, inability to use the drops in time, side effects of topical medications. In short in my practice Primary Open Angle Glaucoma is the most common indication of performing Idrees Trepine Assisted Trabeculectomy for the last so many years.

### The other possible indications can be

Neovascular glaucoma with inactive neovascularization (In some cases I use Intracameral anti-VEGF one week before planning this surgery) and I perform gonioscopy with 12 x magnification to rule out any blood vessel in the angle of anterior chamber, if so I try to close these with argon laser in selected cases.

Uveitic glaucoma which is well controlled.

Angle closure glaucoma not responding to laser iridotomy, peripheral laser iridoplasty and or iridectomy. Secondary angle closure glaucoma.

Childhood glaucoma.

Selected cases of blind painful eyes due to advanced glaucoma and in this situation the basic aim is to relieve the pain by reducing the IOP.

Systemic and ocular co morbid conditions must be given a due consideration and must be managed beforehand while planning this surgery.

This surgery needs fastidious attention to details. The basis is to make a controlled and a discrete opening in the angle of anterior chamber with the help of a trephine with 0.5 mm internal diameter to facilitate the aqueous passage to the subconjunctival space, passing under a partial thickness guarded superficial partial thickness scleral flap.

It is actually an attempt to redesign the procedure of filtration surgery to make it easy, safe, more reliable and with more chances of long term success in controlling the intraocular pressure in patients with glaucoma,

### Contraindications

As we understand everything is not suitable for everyone. In certain situations, we must not proceed with this treatment option. For example

Eyes with severe conjunctival scarring due to any reason for example chronic trachoma, Steven Johnson syndrome, chemical burn etc, such cases are an absolute contraindication for this procedure in my current practice.

Active uveitis causing secondary glaucoma

Neovascular glaucoma with active vascularization of the iris and in the angle of anterior chamber.

Eyes with better potential of vision with available less risky alternate treatment options.

### Preparation

I usually perform this surgery under local anesthesia depending upon the patient and surgeon's preference, however in some cases it can be done under general anesthesia as well. Intraocular pressure is controlled with the needed medications before surgery in advance for at least one week before and 3 weeks after surgery. Pupil is miosed with 2% Pilocarpine eye drops, well before proceeding with the trabeculectomy. I usually instill 2 drops of 5% Povidone Iodine in the conjunctival fornix at 5 minutes interval 15 minutes before starting surgery to prevent post surgery infection. Before this ensure that the patient is not sensitive to Povidone Iodine.

Periocular area is cleaned, patient and eye is dapped to provide the aseptic surgical field. Eye speculum is applied and then I apply a traction suture to keep the area well exposed for the surgery.

### Conjunctival Flap

A fornix based conjunctival flap is made with the help of a Westcott scissor in a backward direction. I prefer fornix based conjunctival flap as chances of cystic bleb formation are minimal with this type of flap and this allows unrestricted backward outflow of the aqueous after surgery and chances of wound leak are minimal and there is no long-term suture related irritation. With fornix based flap a scar forms at the back, which usually restricts the backward flow of aqueous and forms a cystic bleb with all its attendant risk and complications like blebitis etc.

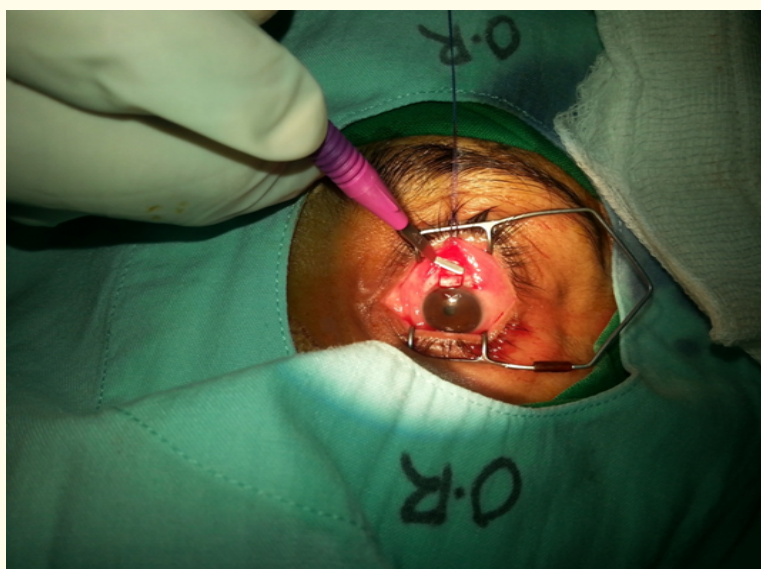


**Figure 3:** A well-formed fornix based conjunctival flap with a well-placed traction suture in place.

### Scleral Flap

Following this a superficial scleral flap which is 4 mm at the base and 3 mm at the other end, is made and ensuring a good haemostasis by judicious use of low temperature cautery to close any bleeder.

The superficial scleral flap about half of scleral thickness is fashioned and is reflected on the cornea and the underlying blue gray limbal zone is exposed. Here I usually prefer to place a BSS soaked rounded disc of cellulose on the cornea to prevent it from getting dry and at the same time it prevents photophobia as well along with reducing the light induced phototoxic damage to the retina.



**Figure 4:** The Scleral flap and crescent knife base in the bed area of the sclera from where flap was created.

### Sclerotomy

At this point a Sisler Lacrimal Trephine mounted on an insulin syringe without stylet is placed vertically centered in the Middle of the blue gray limbal area in a vertically stable position. By rotating the trephine gently, a very well defined full thickness trabeculectomy is done. I stop this rotating maneuver as the resistance is lost and anterior chamber is entered. At this moment take out the trephine and observe a rounded punched out opening of trabeculectomy. At this step reform the anterior chamber. The sclerostomy is 0.5 mm in diameter as is the internal diameter of the Sisler Lacrimal Trephine and this opening is good enough to provide a long term consistently well controlled intraocular pressure in a steady manner without any fluctuations like as with the use of topical eye drops and or inconsistent size of the opening in the angle of anterior chamber as a fistula as it happens in conventional trabeculectomy.



**Figure 5:** The Sisler Lacrimal Trephine mounted on a syringe to make the Trabeculectomy window.

### Peripheral Iridectomy

Take out the peripheral iris with fine tooth forceps, usually it comes out at it's own by gently depressing the sclera behind the sclerotomy opening and then I perform a full thickness peripheral iridectomy adjacent and in front of the sclerostomy opening.

After this I reposit the iris and reform the anterior chamber. Anterior chamber is reformed with BSS and Carbachol is irrigated in the anterior chamber to keep the pupil miosed without getting any iris tissue in the newly created trabeculectomy/sclerostomy window.





Figure 6: Peripheral iridectomy being done.

### Closing the Superficial Scleral Flap

Following this the superficial scleral flap is placed back and two corner sutures of 10/0 Nylon (10/0 Nylon, Alcon Laboratories, Inc, Fort Worth TX) are placed and knots are buried. Then two sutures are applied on either side between the base of the flap and corner sutures. Then an optional suture is applied in the center at the top of the superficial scleral flap between the corner sutures. At this point it is very important to ensure that the knots of 10/0 Nylon are buried well. At this point it must be kept in mind to put a reasonable tension on the sutures to avoid excessive drainage of aqueous and a very low postop intraocular pressure which has it's own risk of complications.



Figure 7: The closed superficial scleral flap.

### Conjunctival Closure

Following this I milk down the conjunctival flap and on the corner, I place 8/0 Vicryl sutures to ensure a well closed conjunctival flap over the superficial scleral flap.

### Final Inspection

At the end of surgery, I would inspect the eye, anterior chamber for any bleed, ensure a rounded well centered rounded pupil, buried suture knots, closed conjunctiva etc.

### Subconjunctival Injection

Following this subconjunctival Carbachol, local anesthesia and antibiotic injection is given in the inferior pericorneal subconjunctival space is given.

This surgery can be safely completed in 15-25 minutes in most of the cases.

After this I will remove the traction suture and eye speculum and will apply a clear sterile plastic shield.

### Postoperative Medications and Advice

Post operatively patient is advised oral analgesic as and when needed, oral IOP lowering medications for three days, topical antibiotic and steroid eye drops for 2 weeks.

Patient is advised for certain precautions regarding postoperative care and follow up is advised on the next day. Patient is advised to avoid bending, stooping, coughing, swimming and strenuous physical exercise. Patient is educated how to use the eye drops and avoid sleeping on the operated side of the eye and face.

Patient must continue their systemic medication for conditions like diabetes, hypertension etc.

### Postoperative Follow Up Evaluation

During follow up visual acuity is checked, external condition of the eyelid, conjunctiva is seen on slit lamp for any congestion especially superiorly along with the scleral flap, any leakage, depth of the anterior chamber, patency of the iridectomy, shape of the pupil. In case if the IOP is too low pupil is dilated and fundus is seen for any choroidal detachment.

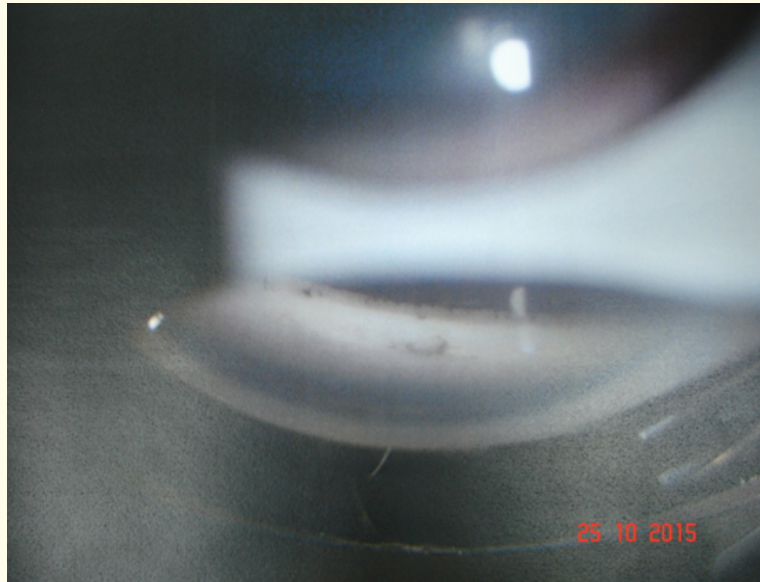
In case if there is a need patient is informed about ocular massage to facilitate the aqueous drainage and to keep the passage patent as it is easy to do so in the early post-operative period as the aim is to induce a fish mouthing of the posterior scleral wound opening. After 4 weeks, it is usually not possible in case it closes.

Topical steroid eye drops are also very helpful in preventing inflammation, reducing scarring and hence keeping the scleral passage patent.

Intraocular pressure is checked before and after massage with air puff tonometer if indicated.

If everything goes well, patient will be seen after 2 weeks then after one month and following this at 2 and then at 6 monthly interval.

After 2 months, I check for the Visual acuity, IOP, Optic disc cupping and visual field. I also perform the gonioscopy as well and what I look for is a rounded opening of 0.5 mm in diameter in the angle of anterior chamber with well controlled IOP.



**Figure 8:** A well defined rounded opening in the angle of anterior chamber as seen after one year on gonioscopy.

### Potential Advantages of This Technique

In many of my cases I have noted an improvement in the visual field as well along with a sustained well controlled IOP without medications in most of my operated cases.

According to my experience this Idrees Trephine Assisted Trabeculectomy Technique is very useful for cases of Primary Open Angle Glaucoma.

Continued patency of the fistula is the most critical factor in the long-term effectiveness of this procedure.

I believe that this technique is more refined and minimally/less invasive technique of filtration surgery with many potential advantages like low cost on the long-term basis, with minimal risk of complications, a reliable and patent opening in the angle of the anterior chamber is achieved with a very high success rate.

The most important advantage of this procedure in my opinion is to have a consistently well controlled IOP with a patent drainage which must be reliable and effective in long term and should be easy to perform with minimal risk of complications in long and short term. More over this technique prevents uncomfortable feeling of bleb formation, wound leaks and chances of failure are minimal, it is easy to learn, teach and practice technique of trabeculectomy surgery, it avoids antimetabolite use related complications. In future I believe more indications for this procedure will find it's way to be included in the list for this technique of Idrees Trephine Assisted Trabeculectomy.

### Possible Complications

Although so far, I have not come across any complications related to this technique of performing trabeculectomy. I personally try to do each and every step in a careful and meticulous way as it will make the next step easy and subsequent surgery smooth with eventually desired target outcome.

However, I believe any of the complication documented to be related with the surgery of trabeculectomy can take place like infection, hyphema, under filtration, over filtration, change in refraction, cystic bleb formation, cataract, choroidal effusion wound leak, suprachor-



roidal haemorrhage, flat anterior chamber, ciliary block glaucoma etc. As we understand there is no surgical procedure which has no risk of complication. However, I believe if we select the cases properly and perform the surgery meticulously and with experience probably the risk of unsatisfactory outcome and complications can be minimized if not completely eliminated.

### Conclusion

To my experience Idress Trephine Assisted Trabeculectomy Technique is safe, effective, easy to learn and practice, has high success rate with minimal risk of complications and can be put into practice without any hesitation or undue learning curve.

### Financial Disclosure

The author has no direct and or indirect financial and or personal interest in any commercial or non-commercial item mentioned in this article.

### Note

I have a design for making a commercial version of the Glaucoma Trephine. I am interested and will be pleased in case if any company is interested in it's commercial production, I am willing to cooperate on this issue.

**Volume 4 Issue 3 December 2016**

**© All rights reserved by Idrees.**