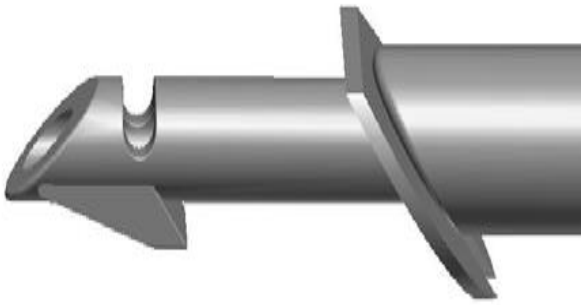
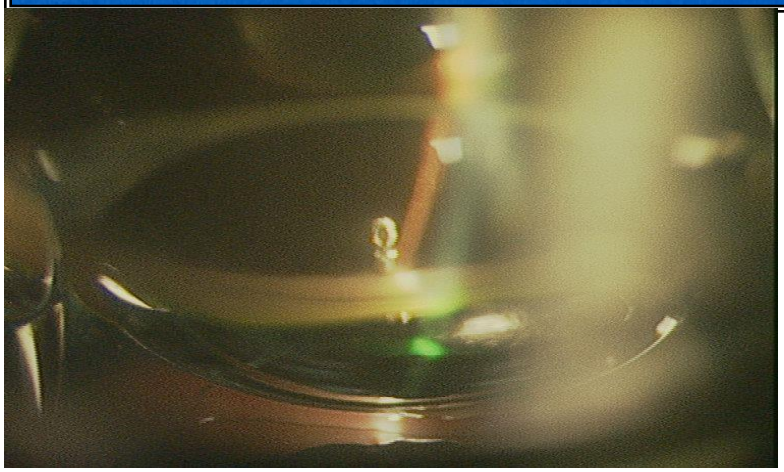
1. **What specifically is the ExPress Mini Shunt?**

Ans: The Ex-PRESS glaucoma implant is a miniature unvalved glaucoma implant made up of stainless steel. It was developed as an alternative procedure to trabeculectomy and to the other types of glaucoma filtering surgery for patients with primary open angle glaucoma (POAG). The device is a 3 mm long stainless steel tube (outer diameter 400 mm (27 gauge)) with a bevelled, sharpened, rounded tip, a disc-like flange (1 mm^2) at the device proximal end, and a spur-like projection that prevents its extrusion. The external flange and inner spur are angled to conform to the anatomy of the sclera, and the distance between them corresponds to the scleral thickness at the site of implantation. The device is biocompatible and has been reported to be reasonably safe and effective.





2. What are the indications and contra indications for its use?

Answer: The indications and contraindications can vary according to surgeon. Basically this surgery can be considered equivalent and alternative to trabeculectomy. I am writing down what I would follow in my practice.

Indications:

1. Open Angle Glaucoma: when medical treatment is inefficient or not tolerable and we are planning surgical intervention.
2. Combined Cataract and Glaucoma Surgery: Open & Angle closure glaucoma. Here in patient with angle closure, we have to be very carefully in selecting a patient. The angle should be open at least on indentation in superior quadrant where we are planning to insert the implant.
3. Aphakic and pseudophakic glaucoma, Uveitic glaucoma: in this kind of secondary glaucoma the long term success even with trabeculectomy with Mitomycin is moderate. Here Ex-press can be considered before going for glaucoma drainage devices like Ahmed valve. Patients with anterior chamber IOL (AC-IOL) or iris claw lenses should not be considered. In uveitic glaucoma, it is important that inflammation should be adequately controlled before we plan surgery.
4. Open Angle Glaucoma patients who failed previous filtration surgery: a repeat trabeculectomy has moderate success and we can consider Ex-press can be considered before going for glaucoma drainage devices. However if there is severe conjunctival scarring, I would consider that to be relaive contra-indication for Ex-press implant.
5. Secondary Glaucoma to Uveitis: (after the inflammation has been well controlled).
6. Angle Recession Glaucoma:

Contraindications:

1. Microphthalmia and Nanophthalmia
2. Congenital glaucoma (unless every other option has failed)
3. Acute Angle Closure Glaucoma

4. Chronic Angle Closure Glaucoma (unless simultaneous lens extraction is contemplated)
5. Neovascular Glaucoma

3. What is the specific surgical procedure you follow in implanting the device? Please elaborate

As I like to perform only fornix based surgery, I would write down surgical steps with fornix based surgery. The limbus based conjunctival flap can also be performed with minimal modifications.

1) Pre surgery anesthesia according to surgeon choice
2) Conjunctival peritomy at the superior limbus with careful haemostasis using a handheld cautery.
3) A triangular / rectangular scleral flap based at the limbus using a crescent blade.
4) Apply MMC soaked Wexcell sponge to the scleral bed and subconjunctival area.
5) Irrigate the scleral bed and conjunctival fornices using balanced salt solution (BSS) after MMC application.
6) Paracentesis using 20- gauge myringotome in superotemporal or superonasal quadrant.
7) Create pre-incision for the Ex-PRESS at the lower end of the blue gray zone of sclera parallel to the iris using either 25 gauge or 27 gauge needle.
8) Introduce the Ex-PRESS into the AC through the pre-incision track.
9) Verify the flow through the Ex-PRESS by injecting BSS through the paracentesis.
10) Suture the scleral flap with 1–2 buried nylon sutures; at least one suture should be placed at the apex of flap in triangular flap. Titrate the sutures with injection of BSS through the paracentesis.
11) Conjunctival suture to the limbus using either 9:00 Mersilene sutures or absorbable 8-0 Vikryl sutures.

4. Have you undertaken any studies for evaluating its effectiveness and safety? If yes, please elaborate and what is the follow-up?

ANS: AS the Implant is made available recently, I have not performed prospective studies in my practice. In my personal experience, last 50 patients I have operated, mean IOP reduction is more than 40%. There are various retrospective and prospective studies also. I would just mention few studies where the ExPRESS implant was compared to trabeculectomy. In a retrospective comparison with trabeculectomy Maris PJ et al reported that the Ex-PRESS implant under a scleral flap had similar IOP-lowering efficacy with a lower rate of early hypotony compared with trabeculectomy. In a prospective study, Jong LA reported similar success rate of Ex_PRESS imlant to trabeculectomy.

7. Is it durable? Are there any complications that result from its implantation? Do you need to give immuno-suppressive medications after implantation?

ANS: The Ex-PRESS device and its material have been US FDA approved for ophthalmic applications since 2002. It is safe and durable. The post-operative complications are also similar to trabeculectomy and needs to be managed in similar fashion. The reported incidence of post-operative complication is similar or lesser then trabeculectomy. We need to give only topical steroids and patient do not require systemic immuno-suppressive medications after implantation

8. Please comment on after care. Do patients with the shunt need to visit regularly? What are the precautions to be taken by patients who have had this device implanted?

ANS: The follow-up visits and post-operative care are similar to those following with trabeculectomy. I routinely see patients on first day after operation, 5-7 days post-op, 2 weeks, 1 month, 3 months, 6 months following the operation, and from then on, every 6 months routinely. This needs to be a patient specific and should be modified according to post-operative clinical picture.

It is steel device and theoretically it can affect the MRI interpretation. However studies have shown that interpretation of MRI scans of the orbit and brain is unaffected by the artifacts caused by the Ex-PRESS shunt, whereas optic nerve imaging may be affected. It is MRI safe, however the manufacturers advise not to do an MRI within 2 weeks after implantation as a safety precaution.

9. If the device fails, what are the remaining options for surgeons?

ANS: The normal cause of failure of an **Ex-PRESS** or trabeculectomy is bleb failure or fibrosis. Before considering re surgery we can consider laser suture-lysis or bleb needling with Mitomycin C. If IOP is not controlled and patient requires another intervention, we can consider device replacement in its current position with a wider diameter device (200μ rather than regular 50 μ). Alternatively, implantation at another site can be preformed, possibly with a higher flow model like the P-50 or P-200. If one Ex-PRESS implant fails and especially due to extensive fibrosis, we can also consider Glaucoma Drainage Device like Ahmed Glaucoma Valve.

10. Is the learning curve a steep one for glaucoma surgeons?

ANS: the most of steps are same as trabeculectomy, the learning curve is not steep. The most important aspect is inserting Ex-PRESS in anterior chamber is that it should not embedded in the Cornea.