



Modified Deep Sclerectomy

by

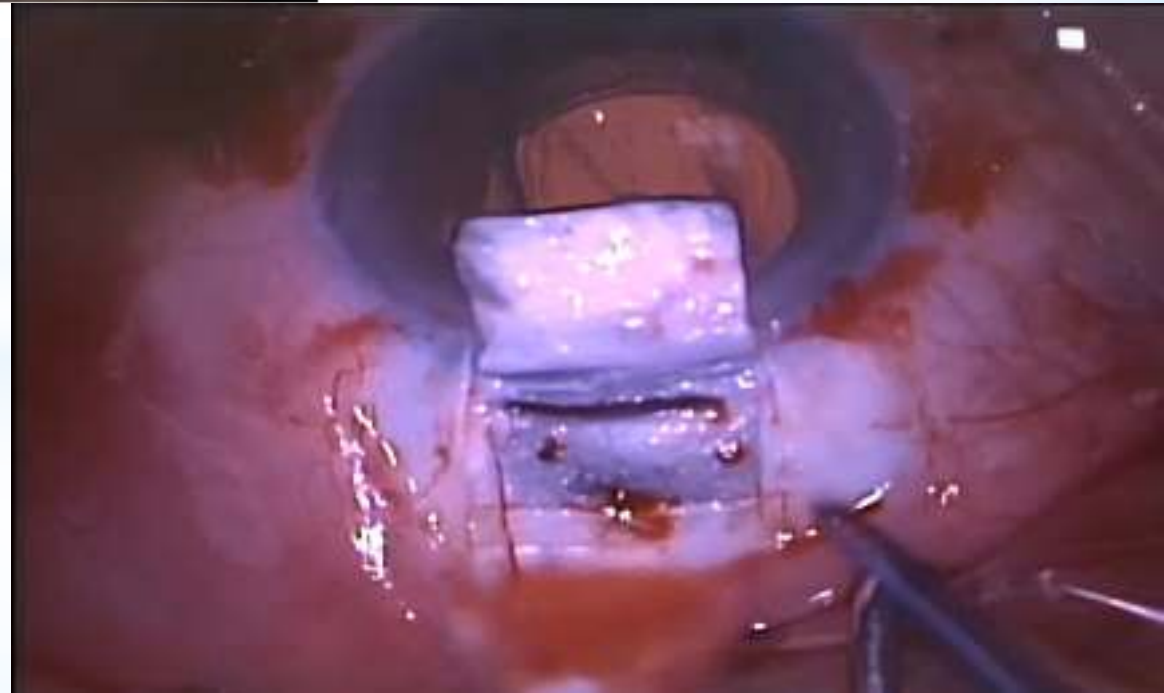
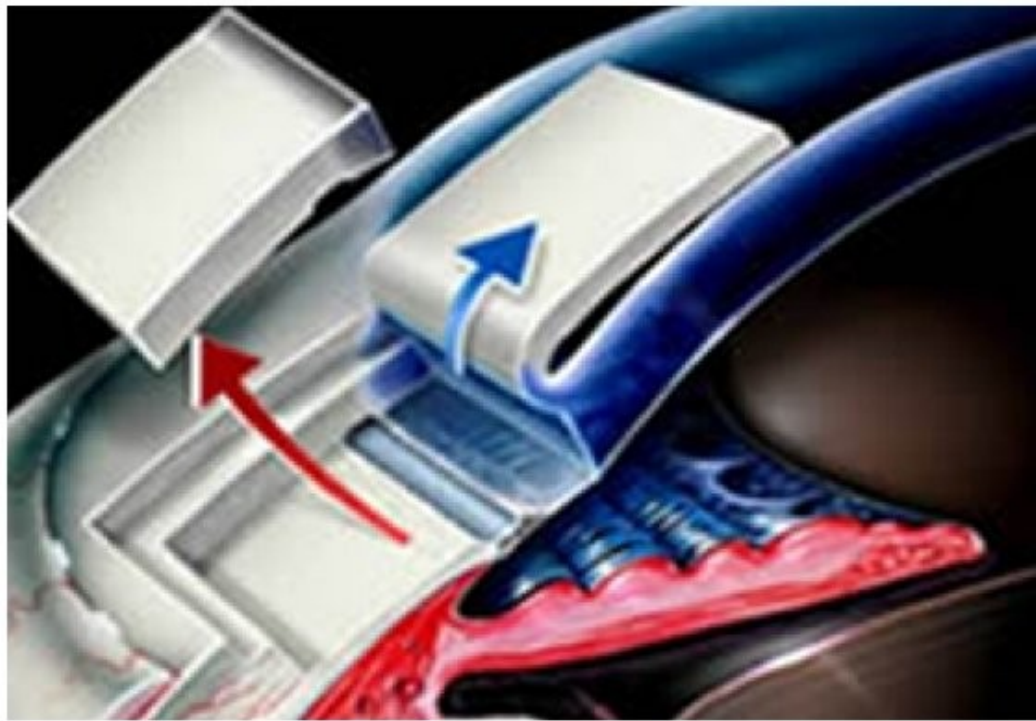
Dr: Mohammad Abbas ,MD

Lecturer of ophthalmology
Al-Azhar Faculty of Medicine

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Deep Sclerectomy

- Was described by Fyodorov and Kozlov in 1990.
- **In deep sclerectomy a deep layer of the sclera is excised after unroofing of the schlemm canal in the superior part of the limbus to expose the percolating trabecular meshwork .**
- In deep sclerectomy the main aqueous humor outflow is located at the level of the anterior trabecula.
- The major advantage of deep sclerectomy is that it prevents the sudden hypotony encountered during and after trabeculectomy.
- The deep sclerectomy allows a progressive filtration of aqueous humor through the thin remaining trabeculo-Descemet's membrane (TDM) into the intrascleral reservoir.



Deep Sclerectomy

Non penetrating

Filtering surgery

that can be Modified

✓ **Non penetrating = (the non penetration of the anterior chamber with avoidance of iridectomy)**

➤ **Non penetration of the anterior chamber means :**

A. Slow decrease of IOP : **DS MORE SUITABLE** in cases of :

1. Glaucoma associated with high myopia .
2. End stage glaucoma.
3. Normal-tension glaucoma

Deep sclerectomy with collagen implant in patients with glaucoma and high myopia

Maurice Hamel, Tarek Shaarawy, André Mermoud

Journal of Cataract & Refractive Surgery 27 (9), 1410-1417, 2001

Conclusions:

Deep sclerectomy with collagen implant provided reasonable control of IOP in patients with glaucoma and high myopia over a long-term follow-up. There were relatively few postoperative complications.

Long-term results of deep sclerectomy in normal-tension glaucoma

Mika Harju, Sakari Suominen, Pasi Allinen, Eija Vesti

Acta ophthalmologica 96 (2), 154-160, 2018

Conclusion

In NTG, long-term significant IOP reduction can be achieved with deep sclerectomy with a low incidence of sight-threatening complications.

B. Less incidence of hypotony and hypotony related complications

Hypotony-associated complications after deep sclerectomy: incidence, risk factors, and long-term outcomes

Alessandro Rabiolo, Duncan Leadbetter, Nitin Anand

Journal of Glaucoma 30 (7), e314-e326, 2021

Chronic hypotony is not uncommon following DS, but clinical hypotony is infrequent. Hypotony associated-complications can occur in eyes without statistical hypotony.

C. Decrease incidence of infection.

➤ Avoidance of iridectomy means :

Reduces the postoperative inflammatory reaction:

DS MORE SUITABLE WITH :

1. **Glaucoma in young patients** with a clear lens in order to avoid any lens opacities and the need for secondary cataract extraction.

Long-term Visual Acuity Outcomes of Deep Sclerectomy in Pediatric Glaucoma

Muhannad I Alkhalifah, Ahmed Mousa, Saleh A Al Obeidan

Journal of Glaucoma 34 (2), 84-88, 2025

Conclusion:

Deep sclerectomy is a reasonable option for pediatric glaucoma that can provide good long-term visual outcomes and IOP control with a lower risk of surgical complications.

Non-Penetrating Deep Sclerectomy versus Trabeculectomy in Primary Congenital Glaucoma

Conclusion: Non-penetrating deep sclerectomy appears to be an efficient and safe surgical alternative to penetrating trabeculectomy in treatment of primary congenital glaucoma. Non-penetrating deep sclerectomy has fewer postoperative complications in comparison to penetrating trabeculectomy with a comparative postoperative reduction in the intraocular pressure and overall success rates.

2. For steroid-induced glaucoma .

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Research Article | [Open Access](#) |  

Outcome of Primary Nonpenetrating Deep Sclerectomy in Patients with Steroid-Induced Glaucoma

Abdelhamid Elhofi, Hany Ahmed Helaly 

Conclusion.

Primary nonpenetrating deep sclerectomy is a safe and an effective method of treating eyes with steroid-induced glaucoma. No major complications were encountered. After 4 years of follow-up, complete success rate was 56.7% and qualified success rate was 70%.

3. In open-angle uveitic glaucoma .

Deep Sclerectomy for the Management of Uncontrolled Uveitic Glaucoma: Preliminary Data

Tiefe Sklerektomie zur Behandlung von unkontrolliertem Uveitisglaukom: erste Resultate

C. Auer¹, A. Mermoud², C. P. Herbort^{1, 3}

Conclusion:

Non-penetrating filtering surgery controlled the intra-ocular pressure in 90 % of eyes with uveitic glaucoma resistant to medical therapy at 12 months. Surgical complications were low which may explain the high success rate of the procedure, compared to classical penetrating surgery.

4. Combined cataract and glaucoma surgery .

Combined surgery for cataract and glaucoma: Phacoemulsification and deep sclerectomy compared with phacoemulsification and trabeculectomy

Fabrice Gianoli, Corinne C Schnyder, Etienne Bovey, André Mermoud

Journal of Cataract & Refractive Surgery 25 (3), 340-346, 1999

CONCLUSION

Deep sclerectomy combined with cataract surgery resulted in an IOP reduction similar to that with phacotrabeculectomy with the same visual outcome, but the lower complication rate makes ambulatory care easier.

. In the case of aphakia . 5

Post-operative inflammation following deep sclerectomy with collagen implant versus standard trabeculectomy

Conclusion: Surgically induced inflammation can be reduced with DSCI. This may be due to the lack of iridectomy, irrigation, and penetration of the anterior chamber. Eyes at increased risk of post-operative inflammation, such as those with uveitic or traumatic glaucoma, may benefit from this procedure. Further studies are needed to evaluate the long-term functional and anatomical outcomes of DSCI.

Because of the significant reduction in the postoperative complications, **deep sclerectomy can be proposed in early primary open-angle glaucoma**. Therefore, long periods of medical treatment can be avoided and the conjunctiva is preserved.

For the same reasons, **deep sclerectomy can be proposed in late-stage glaucoma** as long as trabeculectomy is not feared due to the risk of a potentially visually threatening condition.

Trabeculectomy Vs Non-penetrating Deep Sclerectomy for the Surgical Treatment of Open-Angle Glaucoma: A

Conclusion

Deep non-penetrating sclerectomy seems to be an effective and safe surgical option for patients with open-angle glaucoma unable to be controlled by non-invasive strategies. Data suggests that the intraocular pressure-lowering effect of this technique may be marginally lower than that of trabeculectomy, but the achieved efficacy outcomes were similar, with a significantly lower risk of complications.

✓ Filtering surgery :

1. Filtering bleb (The aqueous humor can leave the eye through several pathways and the conjunctival filtering bleb is generally relatively shallow in functioning deep sclerectomy).

- **Deep Sclerectomy** aims for a **low, broad, and diffuse bleb** that is less prone to sudden fluid drainage and severe complications. This "safer" bleb morphology is the primary advantage of the non-penetrating technique.
- **Trabeculectomy** typically results in a **higher, more cystic bleb** due to the direct filtration pathway. This bleb is associated with lower long-term IOPs, but carries the trade-off of a higher risk for serious bleb-related complications.

2. Anti metabolites use .

3. Needling may be needed.

Comparison of the clinical efficacy and safety of deep sclerectomy with mitomycin-c and trabeculectomy surgeries

Yucel Karakurt¹, Cem Mesci², Hasan Hasbi Erbil³, Senem Salar Gomceli⁴, Huseyin Acar⁵

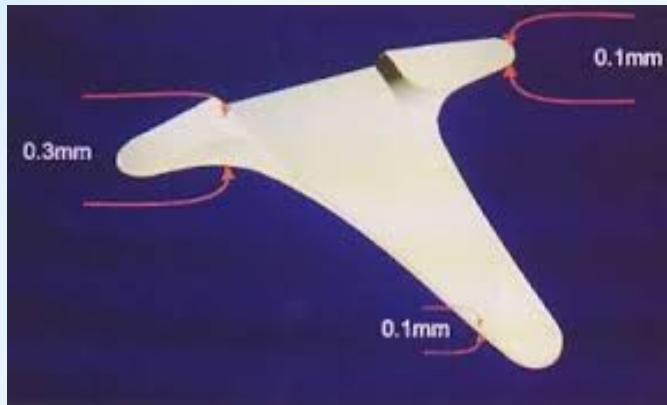
Conclusion: When IOP lowering effects of deep sclerectomy with MMC and trabeculectomy operations were compared, it was found that there was no statistically significant difference between the two techniques. When complication rates were compared, less complication was found in deep sclerectomy operations. It can be concluded that deep sclerectomy is safer than trabeculectomy and as effective as it is.



✓ **Can be modified :**

1. Penetrating deep sclerectomy (As in Juvenile glaucoma)
2. In order to maintain intrascleral bleb patency and to prevent a collapse of the superficial flap over the scleral bed , many implants can be used :

- A space maintainer as collagen implant.
- Viscoelastics.
- HEMA (hydroxyethylmethacrylate).
- High reticulated hyaluronic acid and
- Polymethyl methacrylate (PMMA).
- Esnoper Clip .
- Ahmed suture.



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Deep sclerectomy with collagen implant in one eye compared with trabeculectomy in the other eye of the same patient

Aude Ambresin, Tarek Shaarawy, Andre Mermoud

Journal of glaucoma 11 (3), 214-220, 2002

Conclusions

Deep sclerectomy with collagen implant is another surgical treatment option in the management of glaucoma, showing pressure results comparable with trabeculectomy but with a lower rate of early postoperative complications.

3. Can be combined with other procedures (*our target today*)

- Deep sclerectomy can be combined with other procedures like **ab externo trabeculotomy** to increase its efficacy in lowering IOP .
- Performing deep sclerectomy helps in identification of the cut ends of Schlemm's canal and at the same time we will harvest the advantage of percolation of the trabecular meshwork itself through TDM at the same time.
- **So the combination will help internal drainage through trabeculotomy and external drainage through deep sclerectomy.**

Case over view :

- ❖ A Lt. Eye of 56-year-old female .
- ❖ Free medical history .
- ❖ pre-operative intraocular pressure (IOP) of 38 mmHg .
- ❖ while on **three** topical antiglaucoma medications IOP 22 mmHg.
- ❖ Clinical examination revealed
 - Open angle on gonioscopy
 - Cup-to-Disc (C/D) ratio of 0.7 and a Best Corrected Visual Acuity (BCVA) of 6/24 with nuclear ++ cataract.
- ❖ OCT: Thinning of peripapillary RNFL thickness at most quadrants .
Decreased thickness of macular RNFL and GCL .
- ❖ VF ; Low arcuate scotoma .

Due to the high medication burden and the need for a lower target pressure,

a combined Deep Sclerectomy (DS) and ab externo Suture Trabeculotomy was performed.

Mohammad Abbas, M.D.

CAM 1

At the follow-up,

- the patient's IOP was reduced to 15 mmHg.
- More importantly, the patient achieved **complete success**, maintaining target pressure without the need for any topical medications.
- No significant intraoperative or postoperative complications were noted apart from transient hyphaema which resolved within one week.
- The combined DS and ab externo suture trabeculotomy approach **effectively lowered IOP and eliminated medication dependence**. This hybrid technique addresses multiple levels of outflow resistance while maintaining the **safety profile** of non-penetrating surgery .

The rationale for combining Deep Sclerectomy with an ab externo Suture Trabeculotomy in this case was to address the two primary sites of resistance in the conventional outflow pathway.

First, the Suture Trabeculotomy **physically** opens the juxtacanalicular trabecular meshwork—the point of maximum resistance—restoring access to Schlemm's canal (**physiological pathway**).

Second, the Deep Sclerectomy adds a secondary safety mechanism.

supporting Study: Kitamura et al. (ARVO 2017): Outcomes of 360-degree suture trabeculotomy with deep sclerectomy (S-LOTDS). Finding: In a study of 20 eyes, the mean preoperative medication count was 4.9, which dropped significantly to 1.0 at 12 months. Relevance: This supports your patient's outcome of achieving pressure control without medication, showing that this **specific combination is highly effective at reducing "medication burden" in adult patients**

Outcomes of 360-degree suture trabeculotomy with deep sclerectomy

Yuta Kitamura, Shuichi Yamamoto, Suguru Shirato

Investigative Ophthalmology & Visual Science 58 (8), 4934-4934, 2017

Conclusions: Although a transient elevation of the IOP occurred in 40% of the cases, S-LOTDS is an effective surgical option for lowering the IOP to under 15 mmHg.

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Thank You

For contact

Dr. Mohammad Abbas

Mobile : 01007734537

Mail : drmohammad.abbas@gmail.com