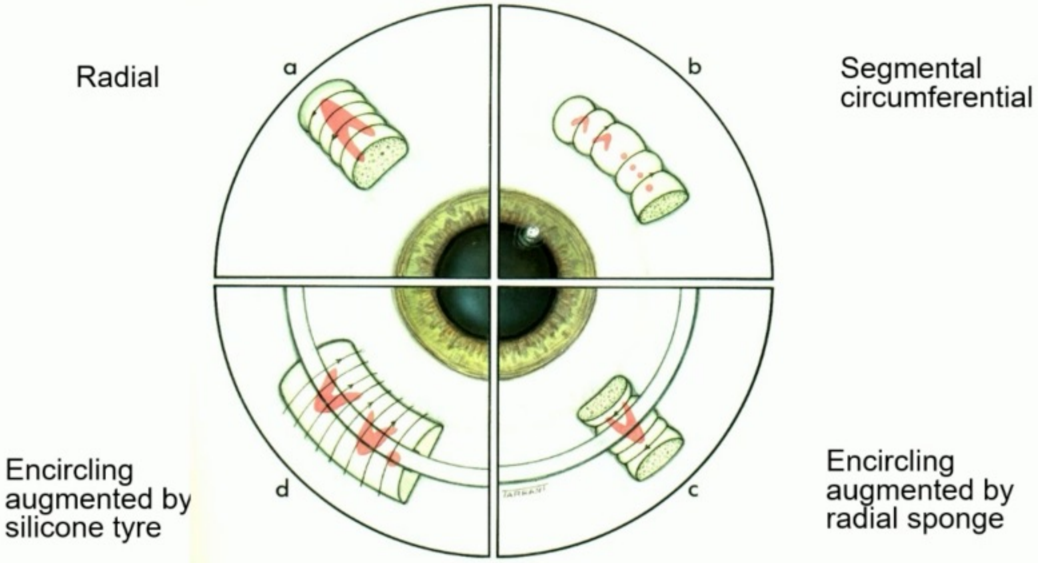
Configuration of scleral buckles

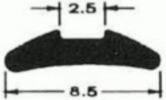


Silicone Buckle/Tire

276

277

278



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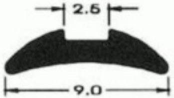

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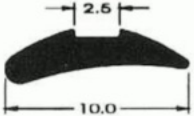
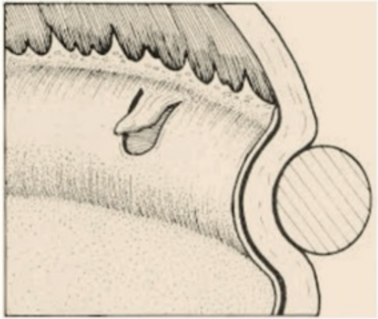
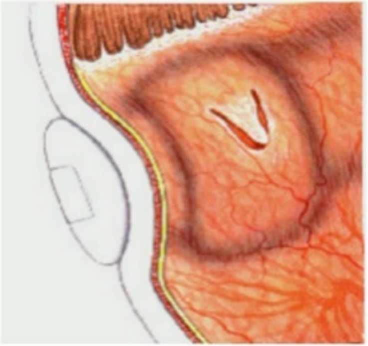


Buckle positioning

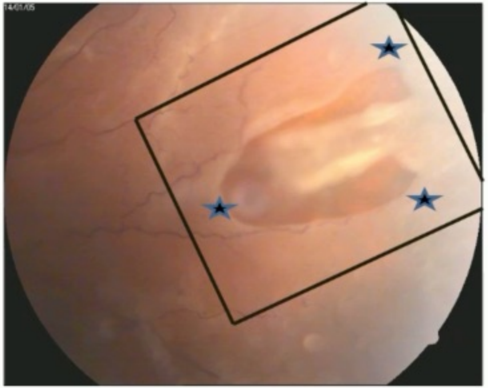
- Crucial for successful surgery
- The anterior-posterior dimensions of retinal break(s)
- Vitreoretinal traction are also important considerations in planning a buckling procedure.
- Scleral buckles should support all edges of the retinal breaks and associated areas of vitreoretinal degeneration.
- In general, the buckling effect should extend into the zone of the vitreous base to eliminate current and future traction forces





Buckle positioning

- Posterior bite of matress suture – 3mm posterior to apex
- Anterior bite -1.5 mm anterior to horns marked
- Break should lie on crest of buckle



Buckle positioning

- Height/Indentation caused by scleral buckling
  - Buckling material - size, shape, and consistency
  - Width of the suture bites
  - Tightness of the tied sutures, and the extent to which an encircling element is tightened which depends on IOP

- A "high" scleral buckle is associated with a significant displacement of intraocular volume.

- Monitor IOP at all steps and also look for arterial pulsations

Control of IOP

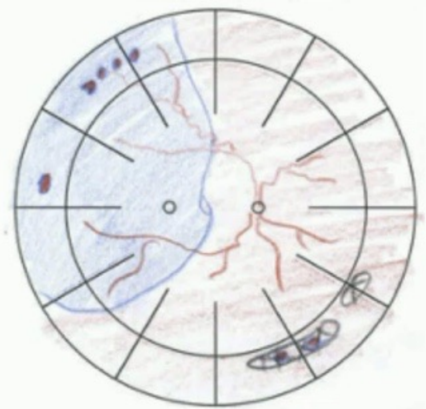
In order to avoid increases in intraocular pressure,

- Preoperative IV mannitol /oral acetazolamide (especially in non-drainage); can also be used intra-op & post-op

- During surgery:
  - Drainage of subretinal fluid
  - AC paracentesis, or
  - Removal of liquid vitreous with vitreous cutter may be required,

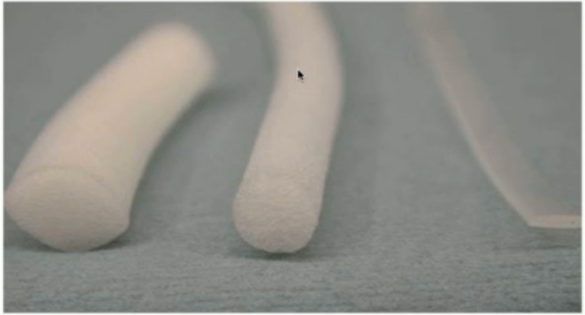
- To be very careful in particularly in eyes with compromised aqueous outflows/pre-existing glaucoma

- Good indirect ophthalmoscopy
- Identification of all breaks
- “Mind map” before surgery

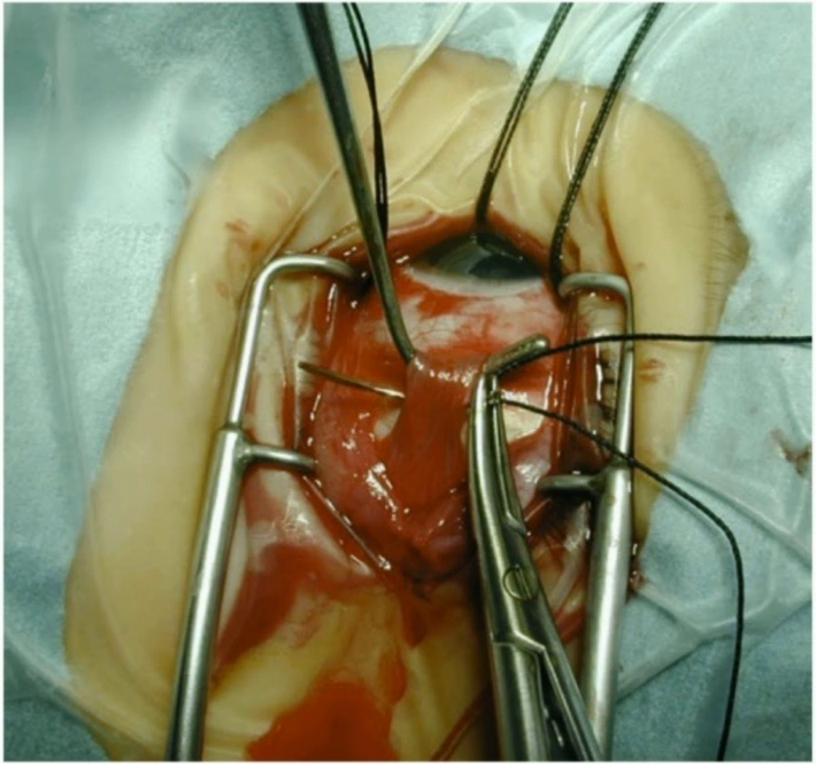


Presbyopia

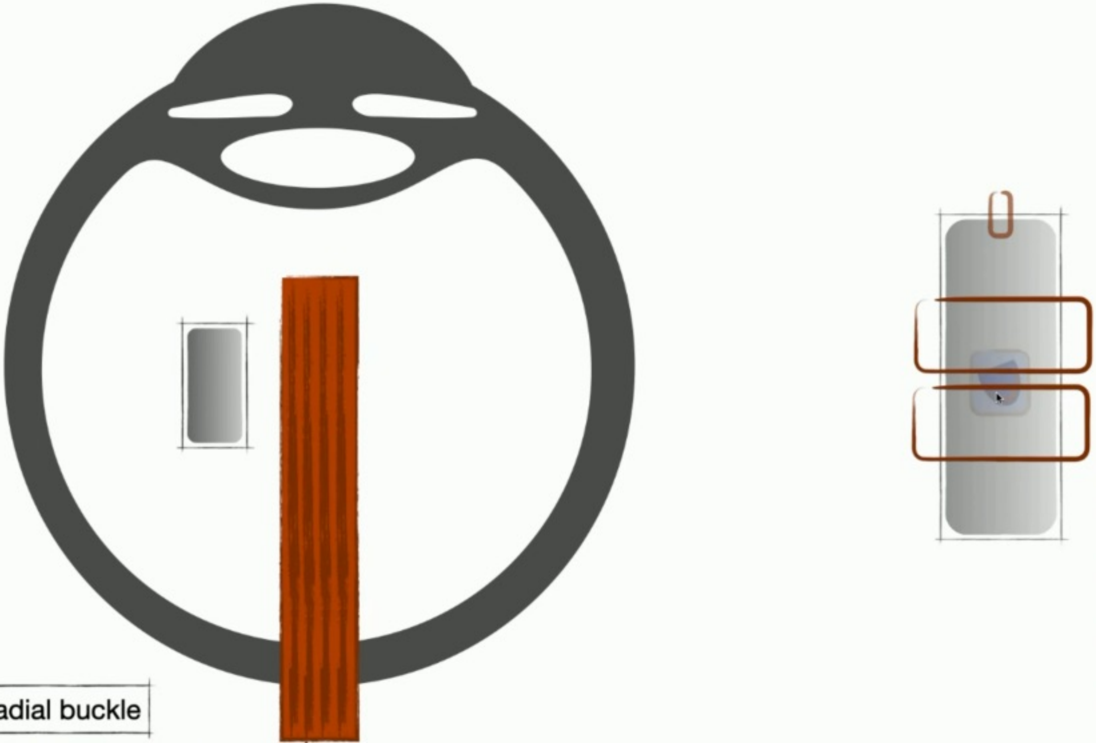
- Microscope
- Loupes
- +4dpt. Bifocals



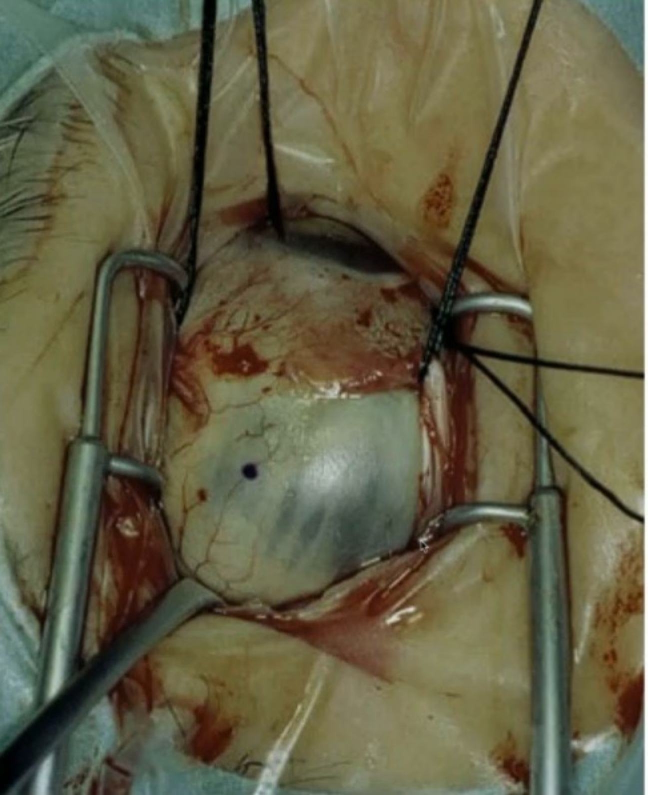
7.5 x 5.0mm 5.0 x 5.0mm 3.5mm



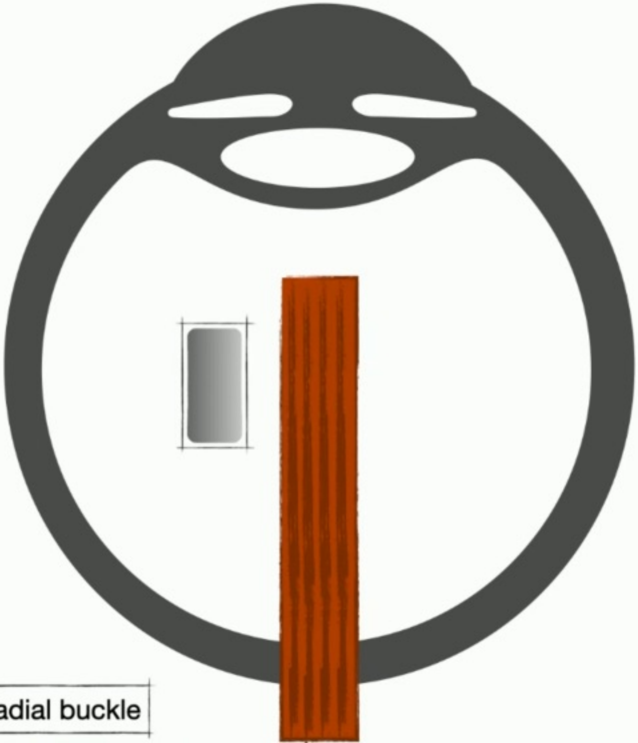
- 360° Periotomy
- Slinging all 4 rectus muscles
- 2-0 silk
- Fisons retractor

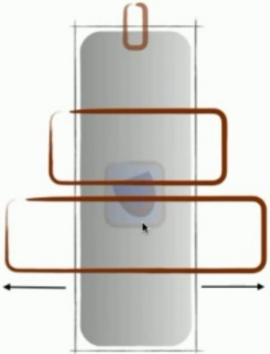


Radial buckle

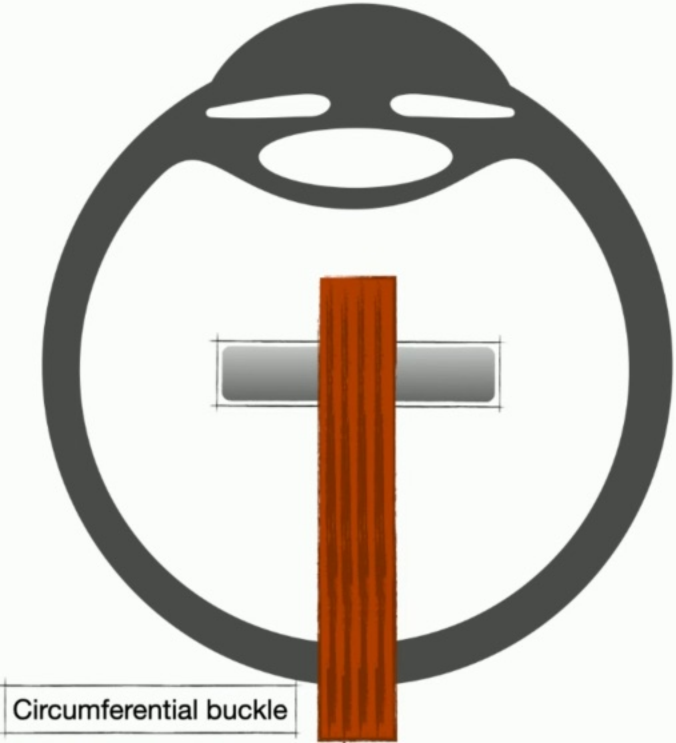


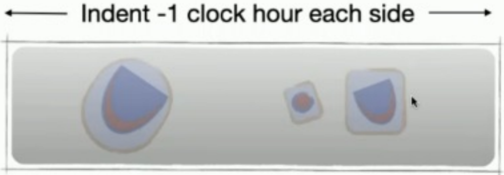
- Look for thick parts of the sclera
- Superficial, but long
- Always see the tip of the needle
- Watch out for perforation when needle end exits the sclera

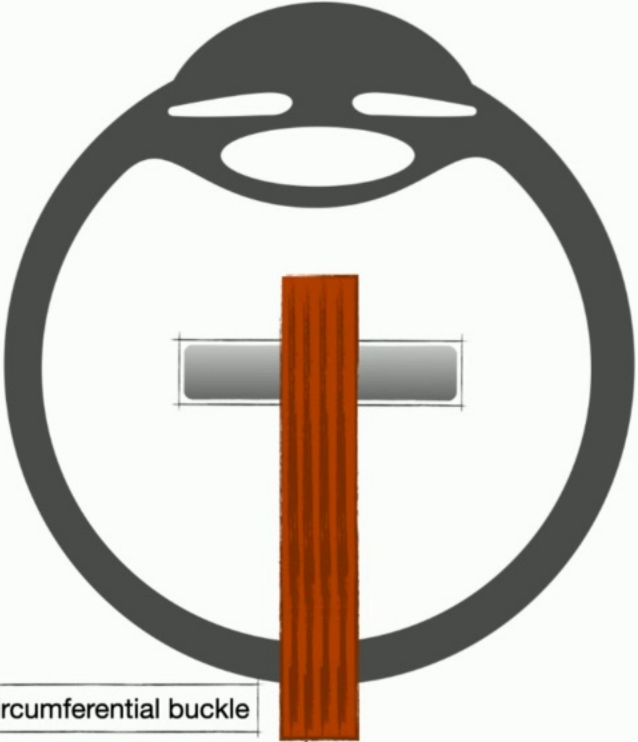


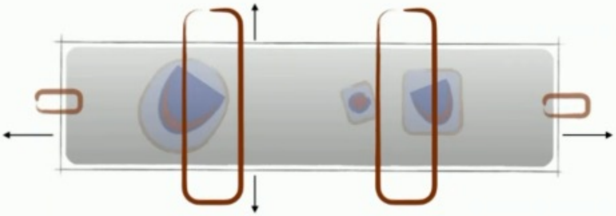


Radial buckle

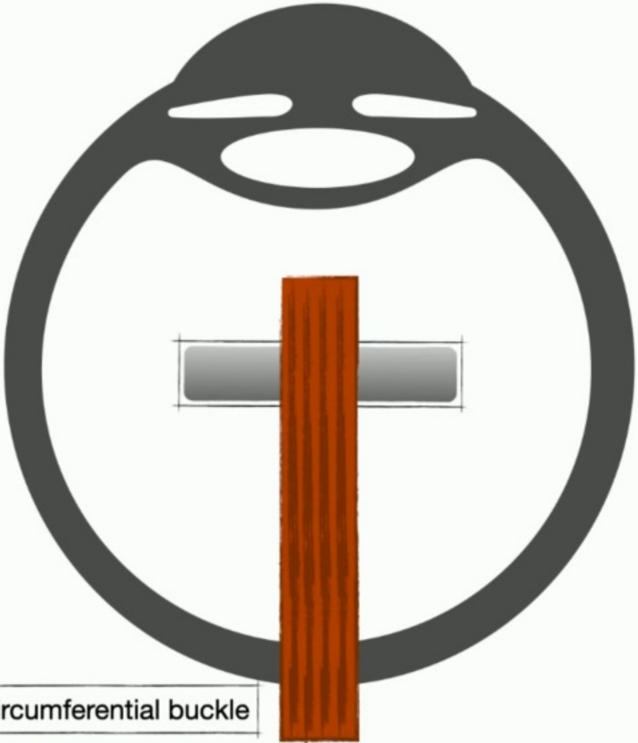

Circumferential buckle

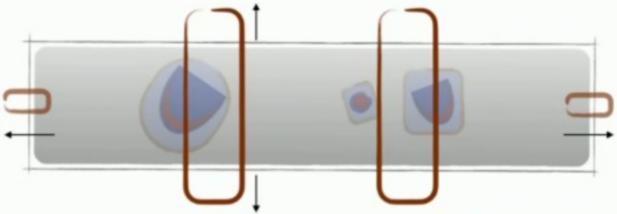

Indent -1 clock hour each side



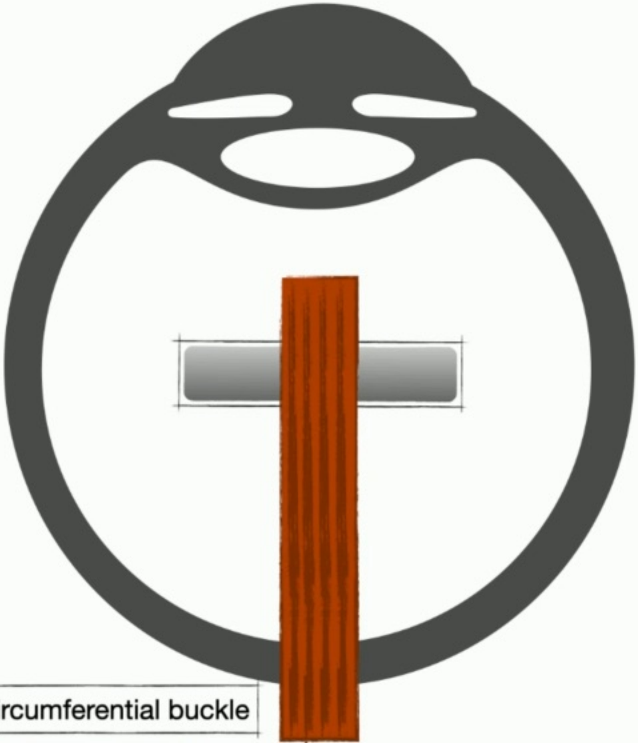


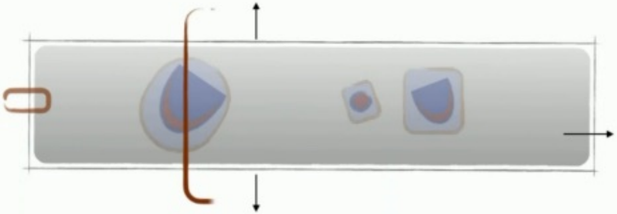
Circumferential buckle



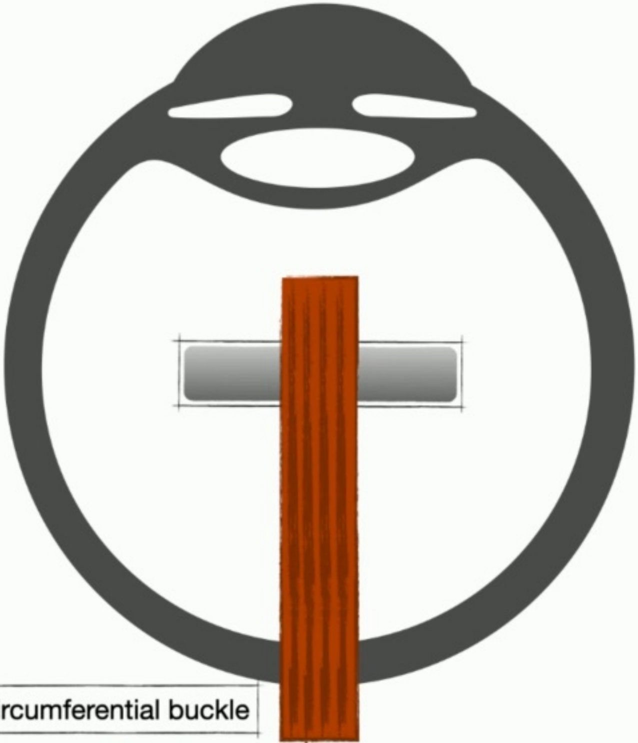


Circumferential buckle

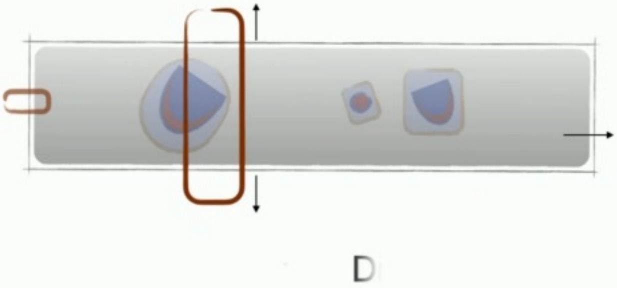


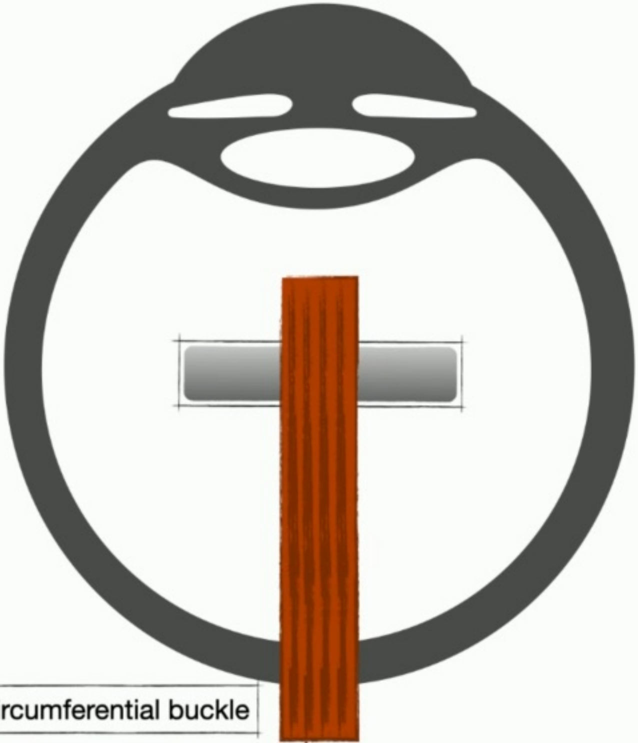


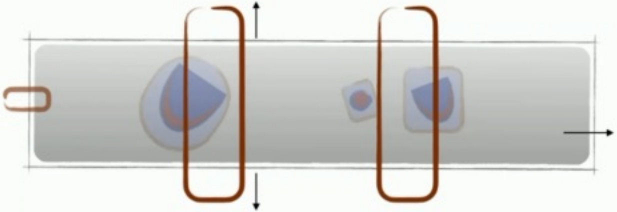
Circumferential buckle

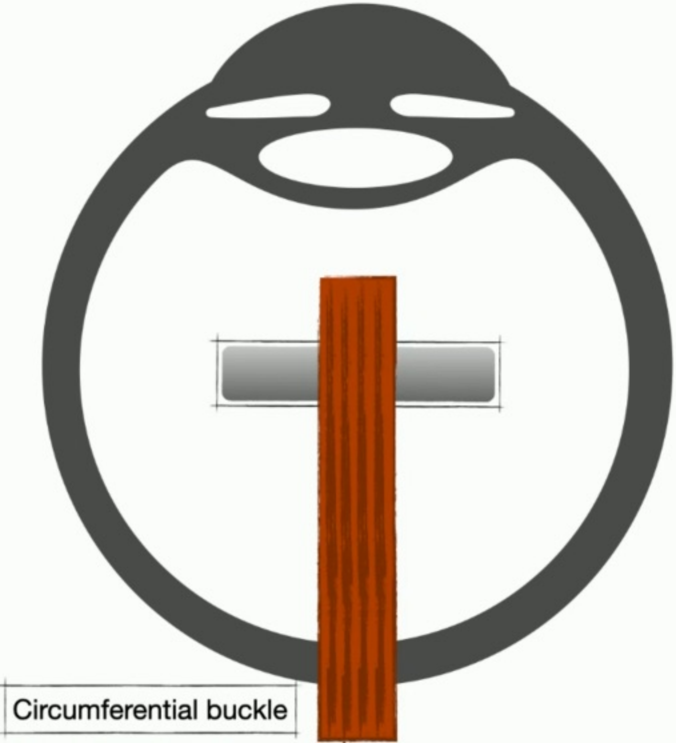


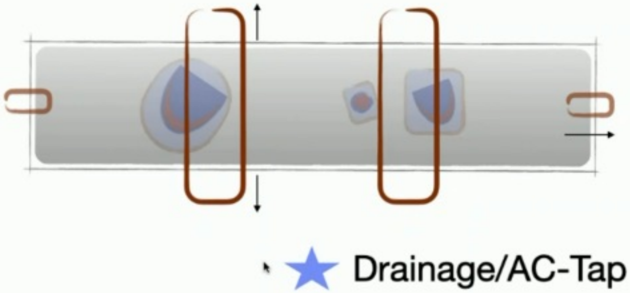
Circumferential buckle




Circumferential buckle


Drainage/AC-Tap


Circumferential buckle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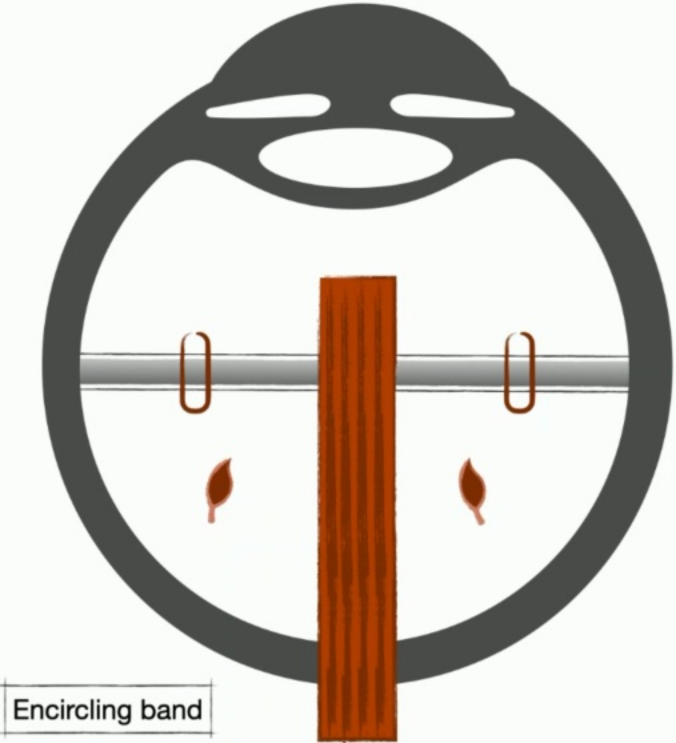
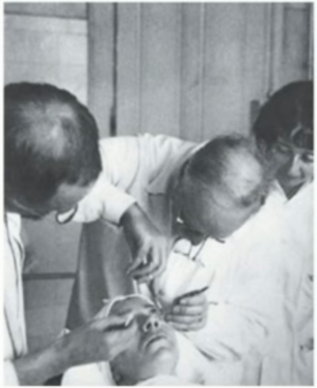


Where is the equator?

- Eyeball it
- Halfway between rectus insertion and vortex veins
- Measure
- Ophthalmoscopy!!

History

Since its initial description by Jules Gonin, external needle drainage of subretinal fluid has served as a successful but controversial technique to assist with retinal detachment surgery.



Gonin J: Retinal Detachment. Lausanne, Payot et Cie, 1934.

To drain or not to drain?

Hilton et al (1981): 120 eyes randomized to buckling without and with external drainage

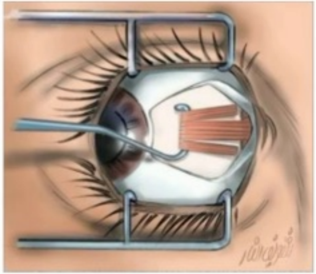
- Complication rate higher in the drainage group
- Primary anatomical success rate similar in both groups (87% vs 83%)
- BCVA not different between groups 6 months after operation

Hilton GF, Grizzard WS, Avins L et al. The drainage of subretinal fluid. A randomized controlled clinical trial. Retina 1981; 1: 271-80.

Where to drain?

- Drainage must be in the area of subretinal fluid, but away from the break(s)

- Reduced risk of complications at the watershed of vortex vein territories near the horizontal (as opposed to the vertical) recti[1,2] and the sequence of individual retinal procedures [3]



1 Burton RL, Cairns JD, Campbell WG, Heriot WJ, Heinze JB. Needle drainage of subretinal fluid: a randomised clinical trial. Retina 1993; 13: 13-6.
2 Michels RG, Scleral buckling methods of rhegmatogenous retinal detachment. Retina 1986; 6: 1-49.
3 Gilbert C, McLeod D. D-ACE surgical sequence for selected bullous retinal detachments. BrJ Ophthalmol 1985; 69: 733-6.

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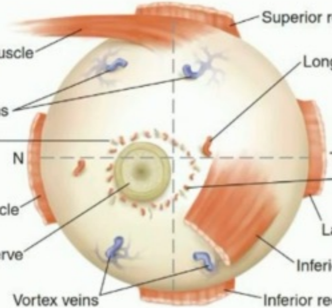

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Sequence

External needle drainage takes place after cryotherapy has been applied and the scleral buckle has been placed around the eye with sutures, may be difficult in bullous detachment

D-ACE: Initial drainage of subretinal fluid followed by air injection into the vitreous, transcleral cryopexy, and definitive scleral buckling.

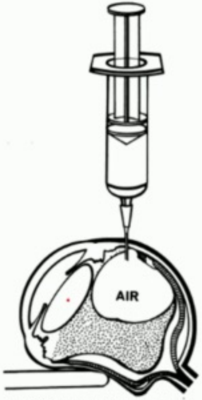


Fig. 1 *Needle-tip-high method of intravitreal air injection (after Norton).*

*Gilbert C, McLeod D D-ACE surgical sequence for selected bullous retinal detachments. British Journal of Ophthalmology 1985;**69**:733-736.*

Complications of external subretinal fluid drainage

Table 2 Incidence of haemorrhage complicating SRF drainage in published series

Type of drainage	*Reference*	*Incidence of haemorrhage*	*Prospective or retrospective*
Conventional scleral cut down	Hilton[2]	10%	Prospective
Conventional scleral cut down	Wilkinson *et al*[4]	3·1%	Retrospective
Conventional scleral cut down	Wong *et al*[12]	8%	Prospective
Conventional scleral cut down	Burton *et al*[13]	12·7%	Prospective
Needle aspiration	Burton *et al*[13]	22·2%	Prospective
External argon endolaser probe	Ryan *et al*[14]	5·5%	Retrospective
Suture needle	Raymond *et al*	6·4% 'significant' 13·8% overall	Prospective

Raymond G, Suture needle drainage of subretinal fluid. British Journal of Ophthalmology 1993; 77: 428-429

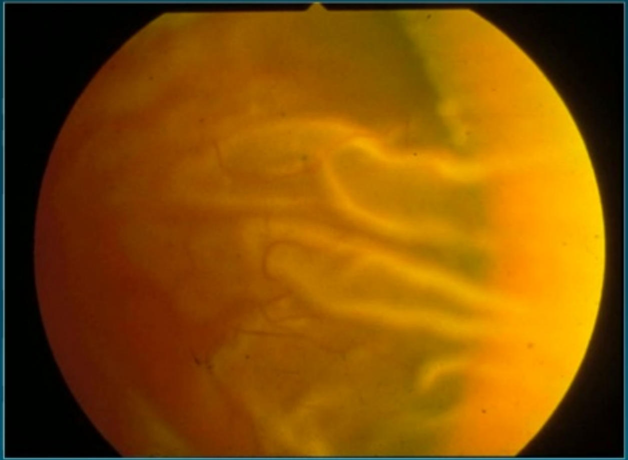
Summary

- Subretinal fluid drainage may be beneficial to expedite retinal reattachment and facilitate intraoperative retinopexy, especially when large amounts of SRF present
- Benefit of SRF drainage not confirmed in clinical trials
- Different techniques with similar rates of complications
- Choose site of drainage carefully to avoid complications

Avoid SRF Drainage Complications

- Locate where to drain
- Two-step approach: scleral incision then choroidal incision
- Sign of retinal incarceration
- When to stop drainage
- No drainage in some cases
- No suturing of the scleral incision

Fish-mouth Phenomenon



Wang and Snead. Scleral buckling—a brief historical overview and current indications. Graefe's Archive for Clinical and Experimental Ophthalmology 2020

Persistent Retinal Fluid After SB

- The absorption of SRF after SB may be correlated with choriocapillaris flow density.
- Age and location of breaks are significant factors affecting the absorption of SRF.
- The duration of disease is an uncertain factor due to several subjective reasons.

Long et al. Multifactor analysis of delayed absorption of subretinal fluid after scleral buckling surgery. BMC Ophthalmology 2021

One of the Longest F/U

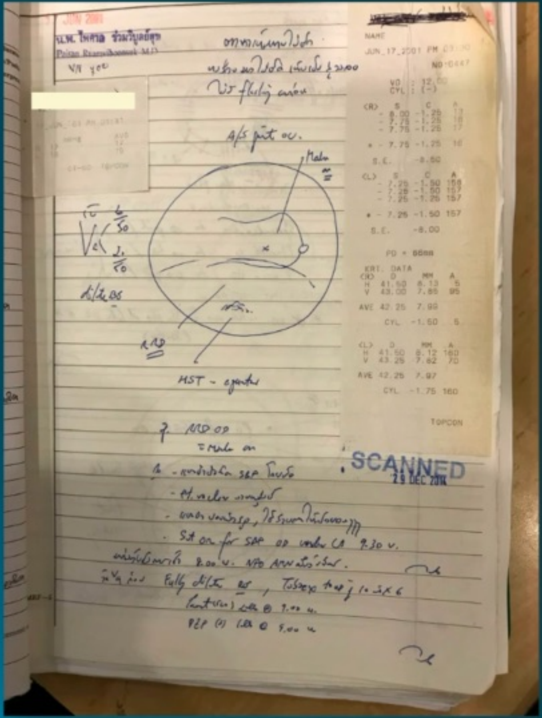
A 42-year-old male with primary RRD for 2 weeks.

BCVA 20/25, inferior detachment, single break at 6 o'clock, macular on.

Scleral buckle was performed without retinopexy in June 2001. (22 years ago)

He had POAG well-controlled with timolol and latanoprost.

Retina still flat with BCVA 20/30.



Comparison of Complications: SB vs. PPV

Table 1. Pooled rate of surgical complications after scleral buckling and vitrectomy for rhegmatogenous retinal detachment. Data from Lv et al. 2015 [90].

Complications	Scleral Buckling	Vitrectomy
Subretinal haemorrhage	5.1%	0.9%
Hypotony	23.2%	0%
Iatrogenic breaks	0.2%	8.2%
Choroidal detachment	3.1%	0%
Residual SRF	19.6%	0%
High IOP	5.4%	11.6%
Corneal epithelial defect	1.8%	5.5%
Diplopia	2.7%	0.5%
Cataract	23.6%	53.1%
CME	2.6%	2.8%
macular pucker	7.4%	5.7%
Postoperative PVR	11.2%	11.1%

Footnote: SFR, subretinal fluid; IOP, intraocular pressure; CME, cystoid macular edema; PVR, proliferative vitreoretinopathy.