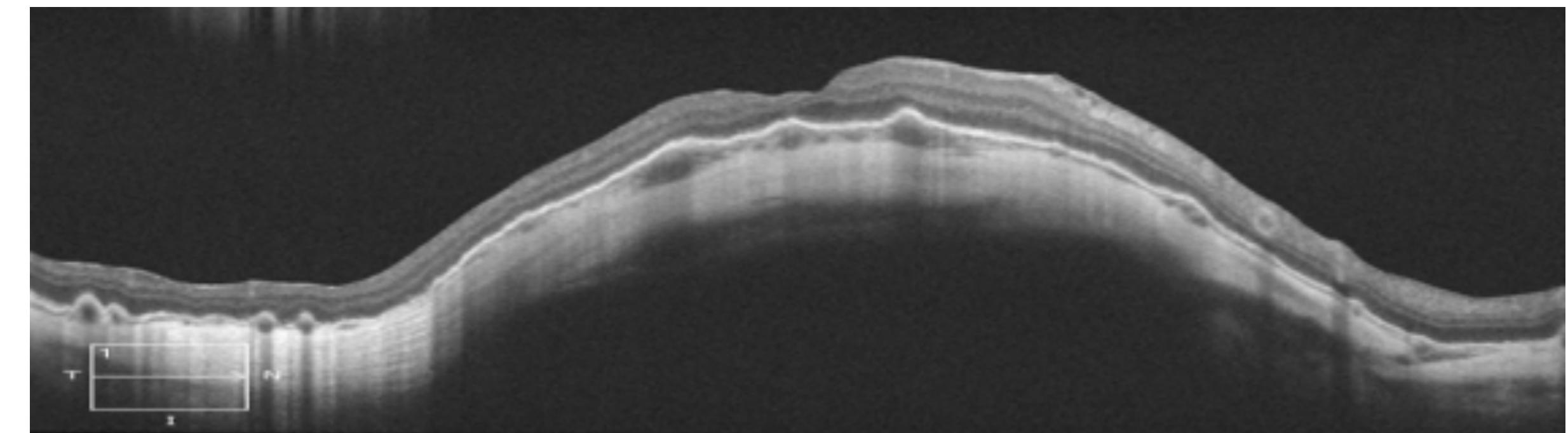
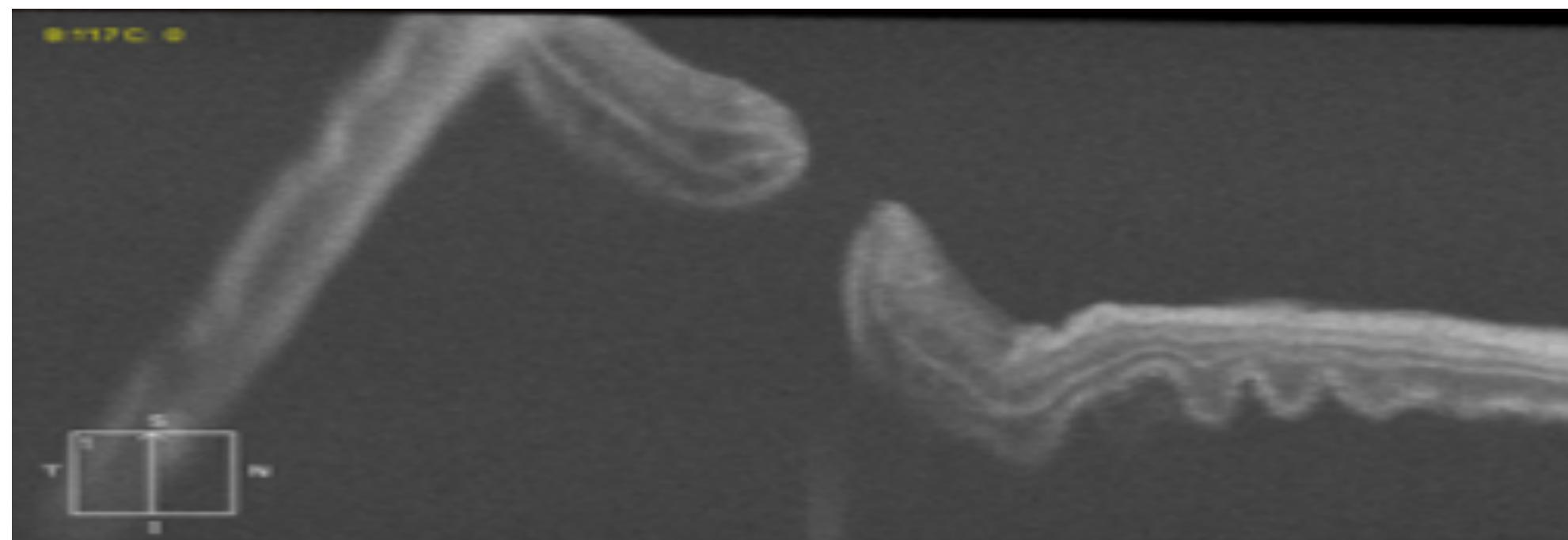


Macular Buckling in High Myopic Macular Hole Detachment

(PRO)



Let me ask you

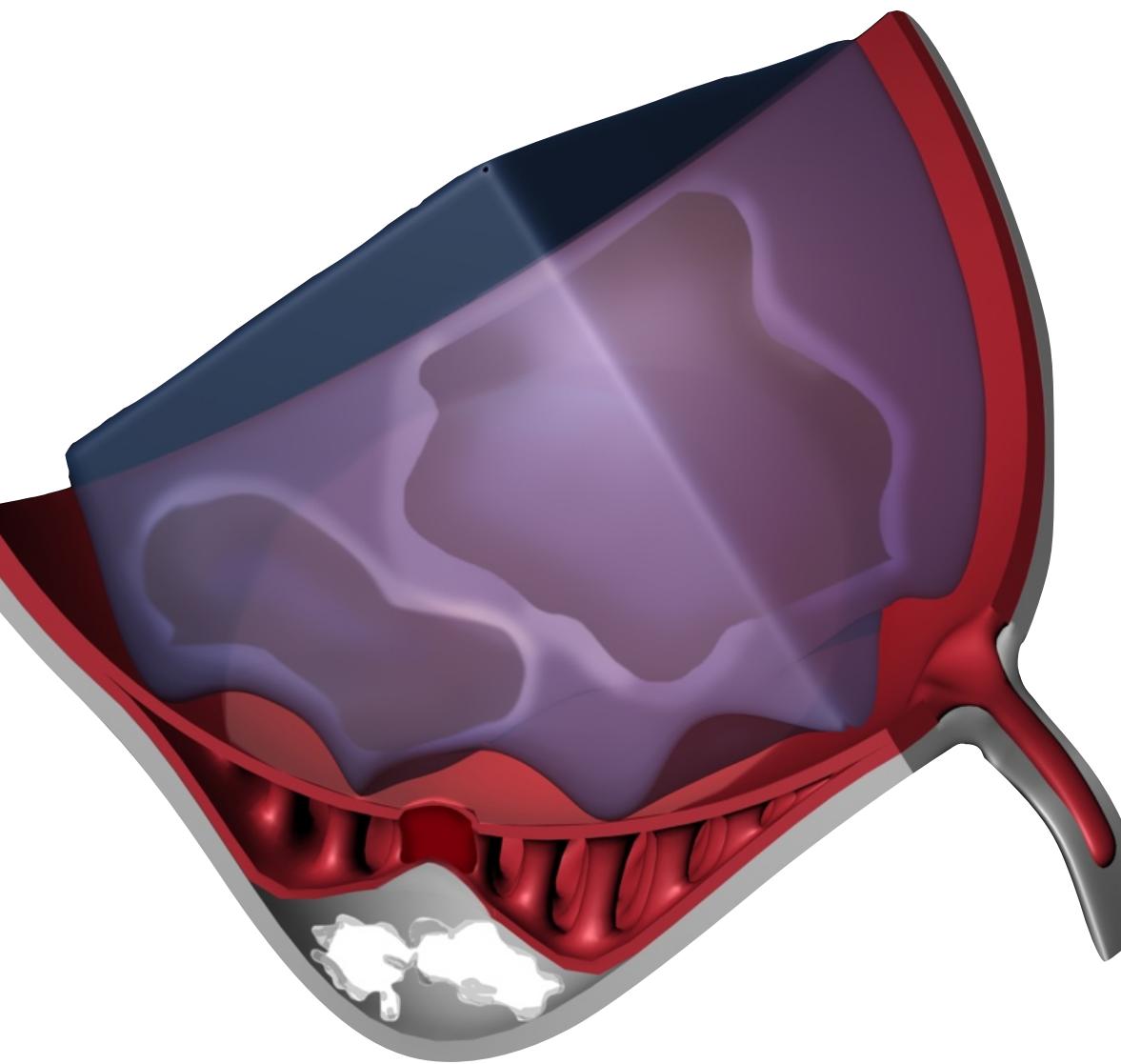
How many of you have experience in more than .. let's say 20 cases of Macular Buckle surgery ??

Let me guess...

? % ??

It means difficult to win

Don't worry !!!! I am use to it !!!!



Different traction forces account for MHRD in high myopia

Vitreous Traction (Machemer)

Anomalous Internal Limiting Membrane (Tano et al)

Stretched retinal vessels in temporal arcades (Tano et al)

Posterior staphyloma

“Retina Shrinks” as early as 2 days after RD (Lewis et al)

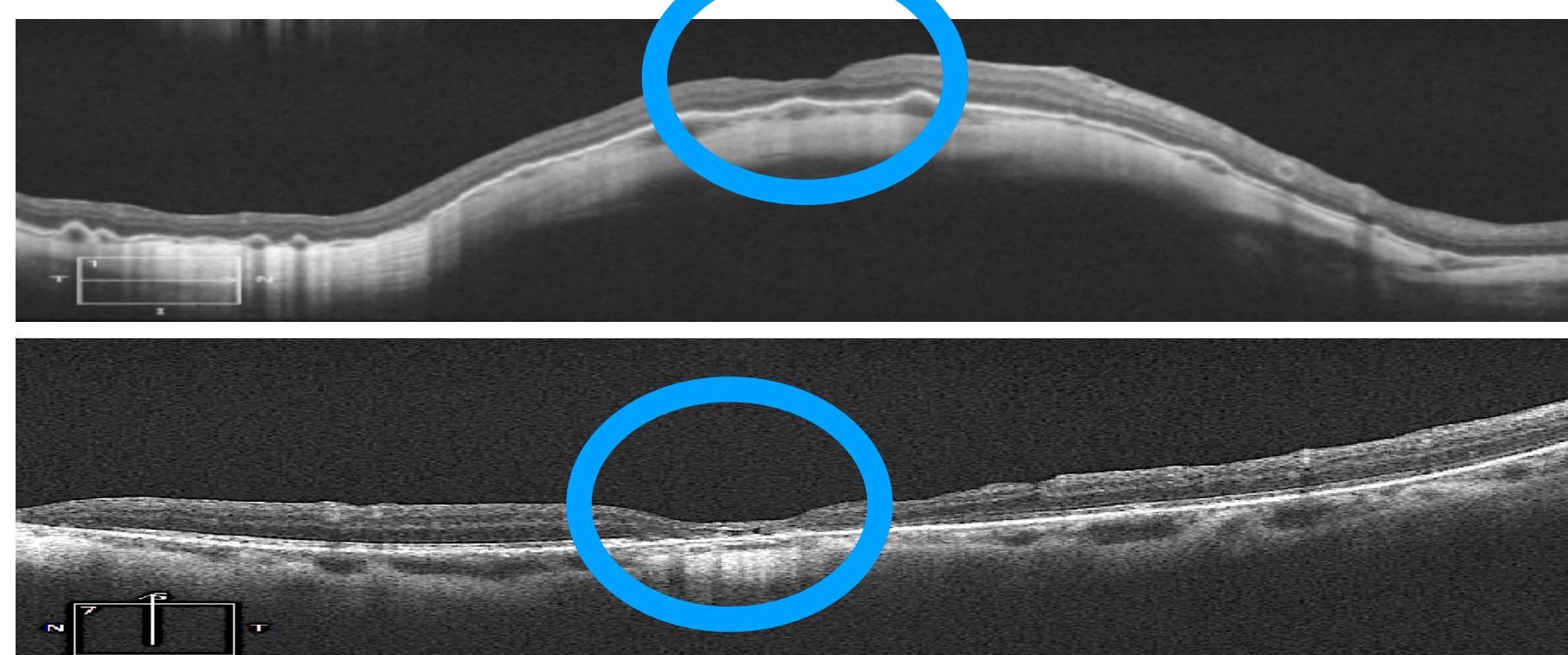
Pars Plana vitrectomy may relieve only two of these traction forces (*-)

Macular buckling was designed to

Counteract the pulling effect of the Staph

Reduces the inward forces of the stretched retinal vessels

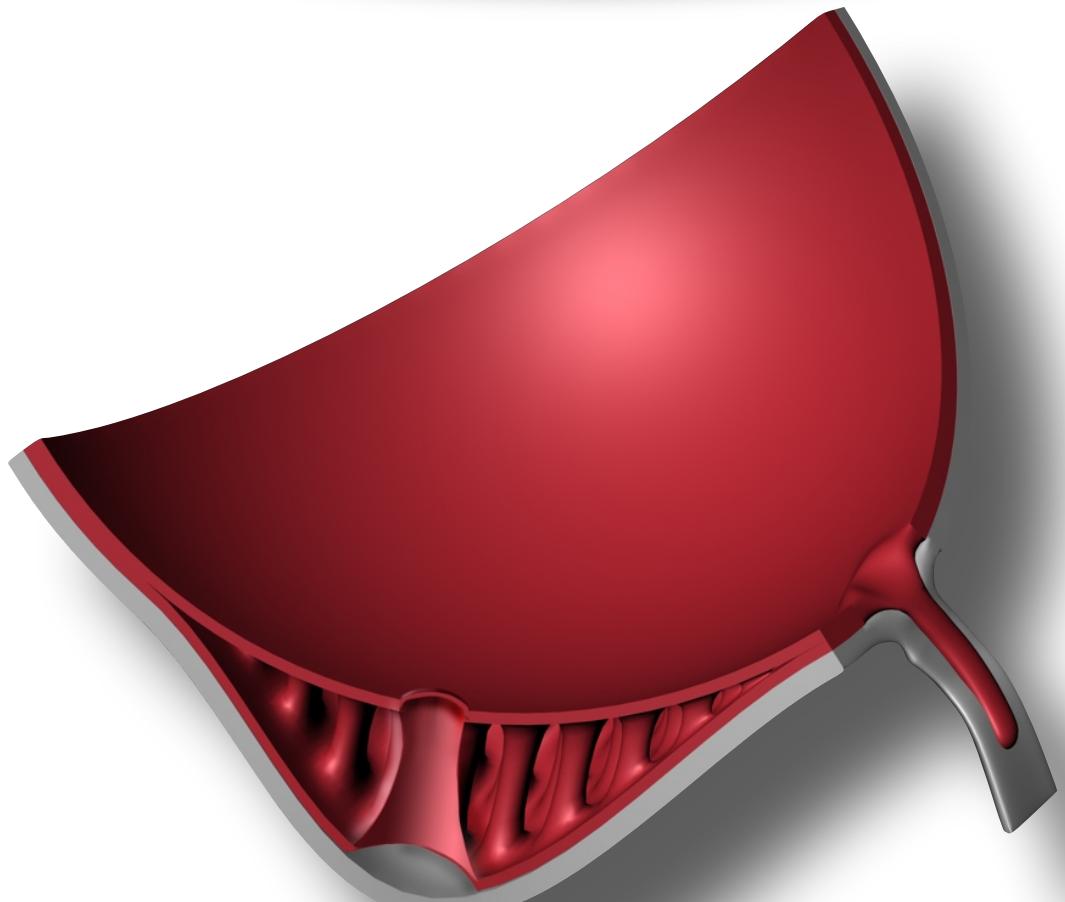
(*) !!!



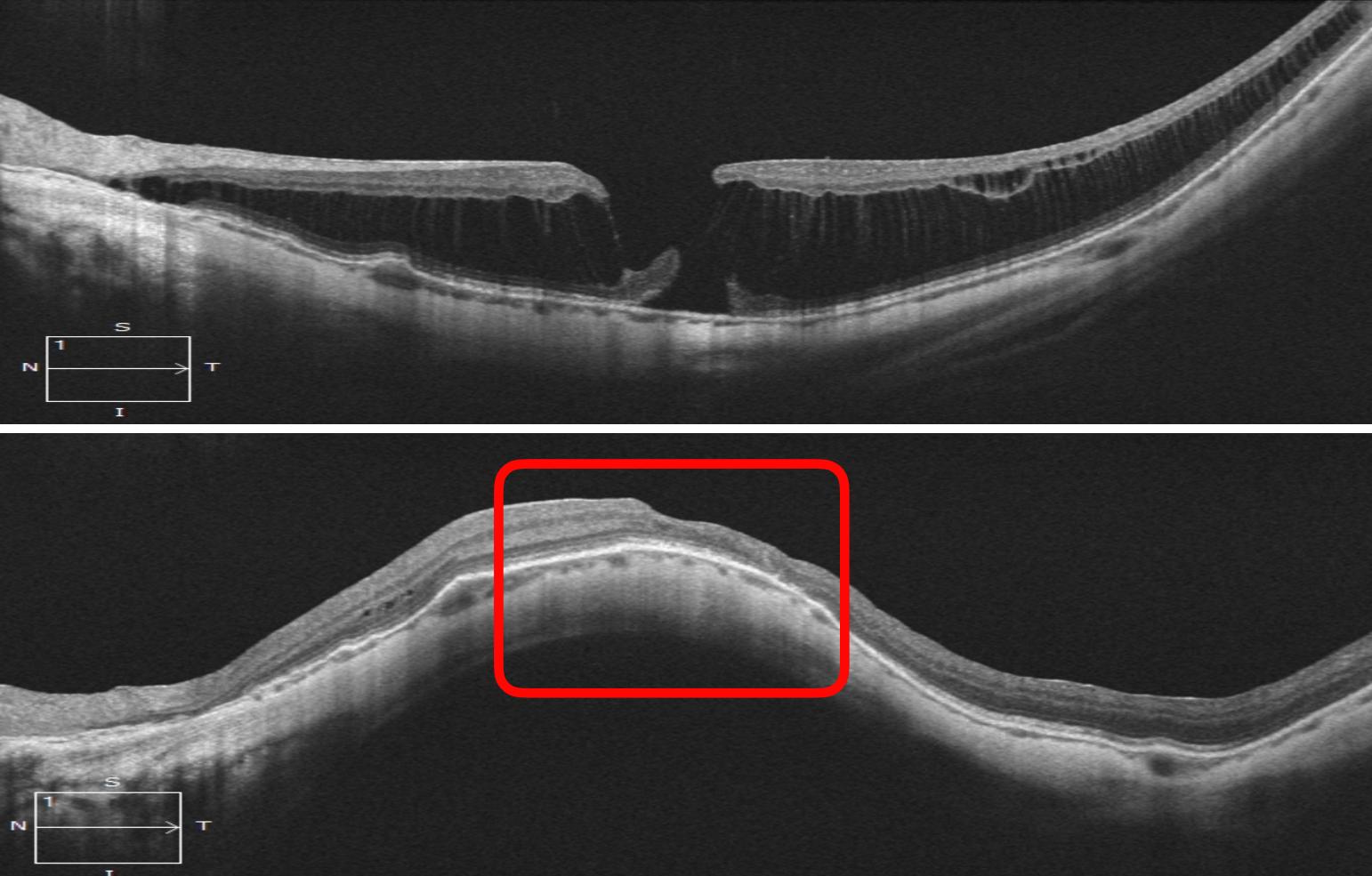
Restoration of ELM seems essential to IS/OS restoration and visual improvement

Current indications of Macular Buckle (± Pars Plana Vitrectomy)

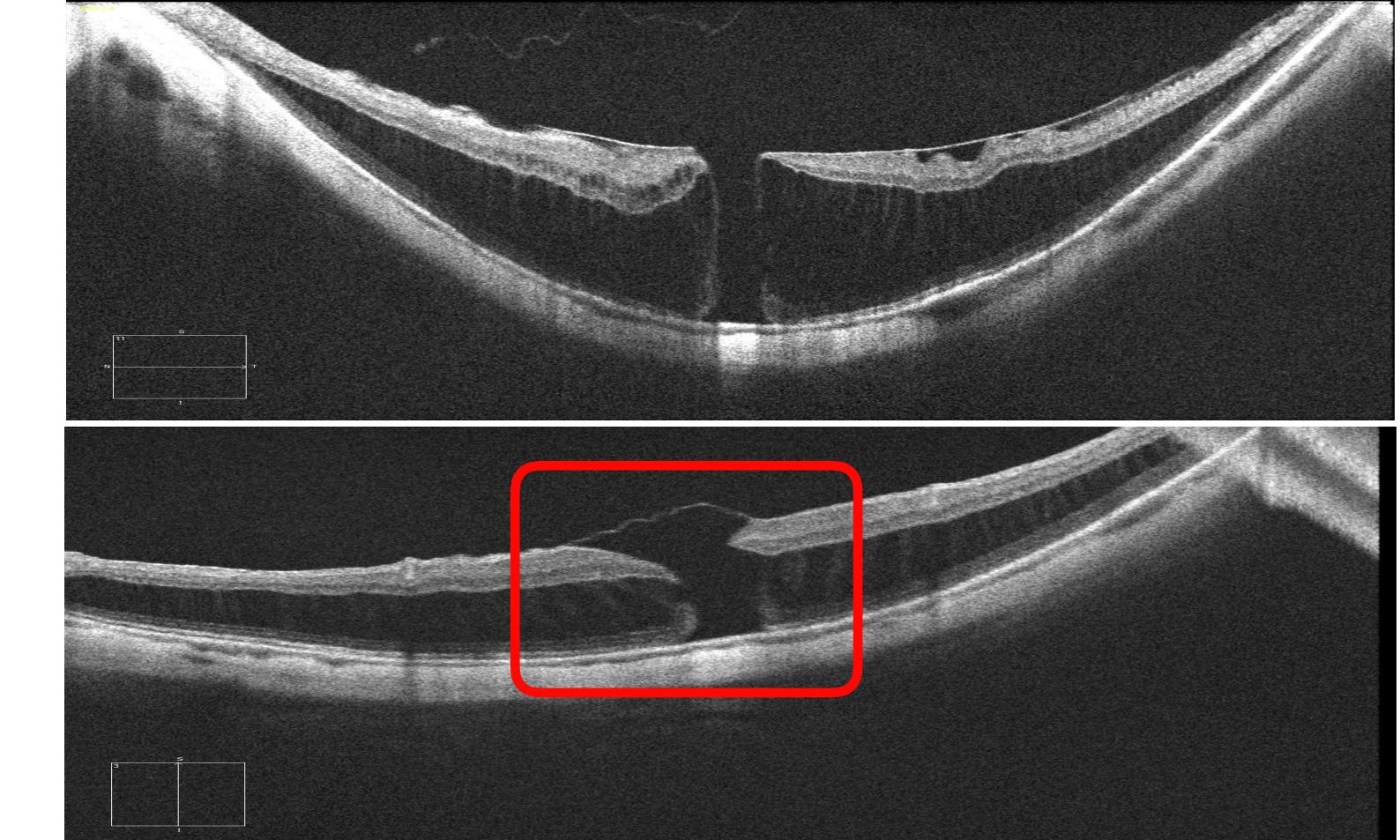
Macular Hole with Schisis



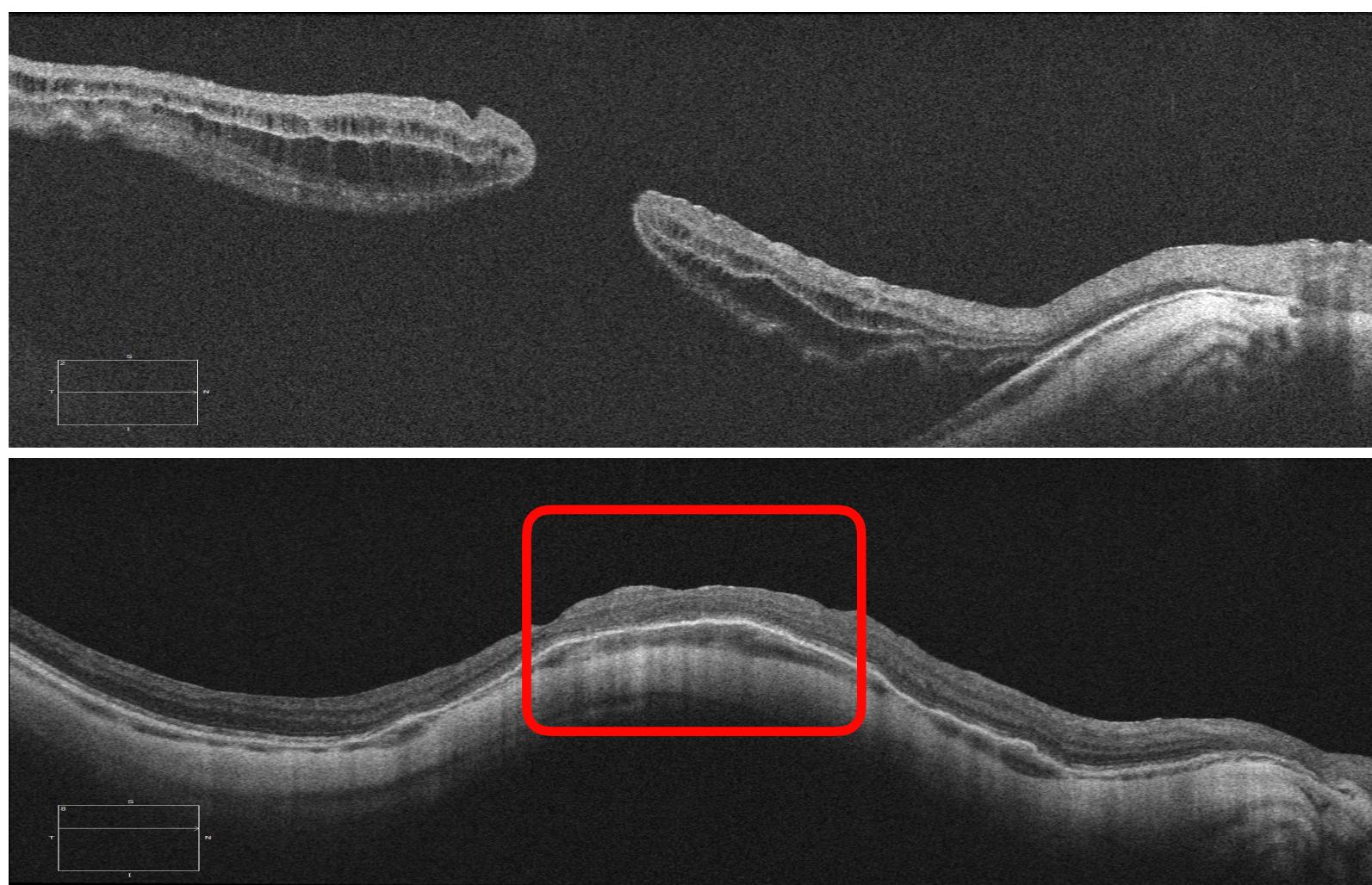
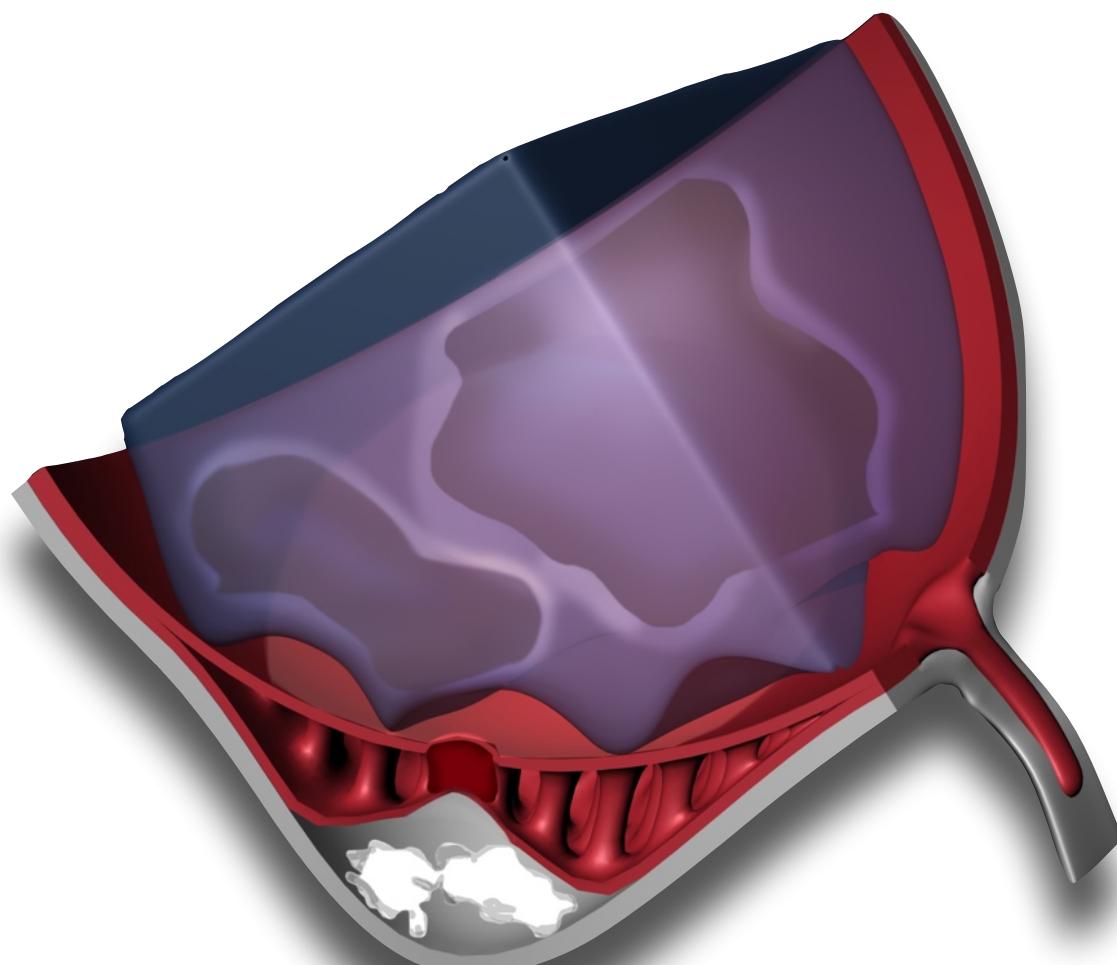
Macular Buckle + PPV



PPV + Inverted flap

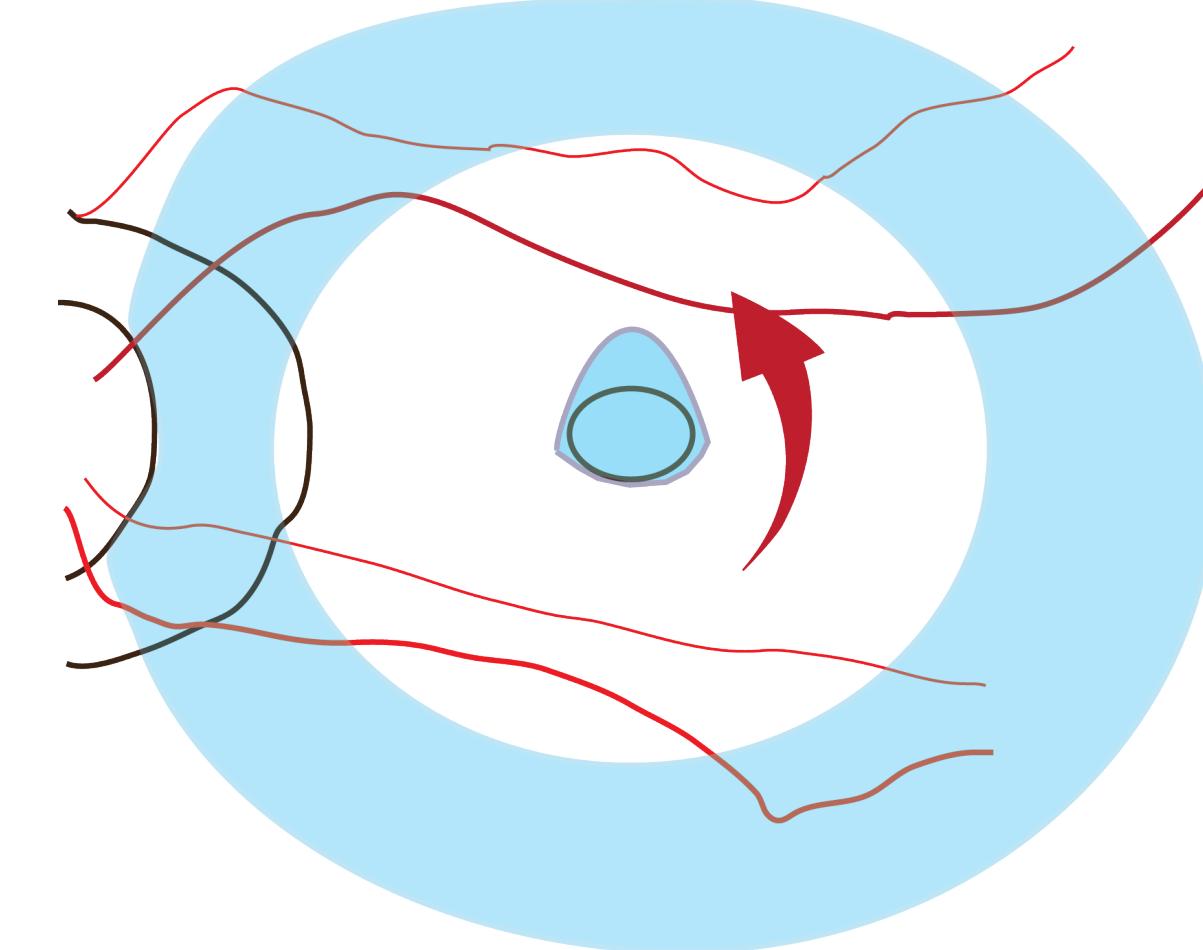
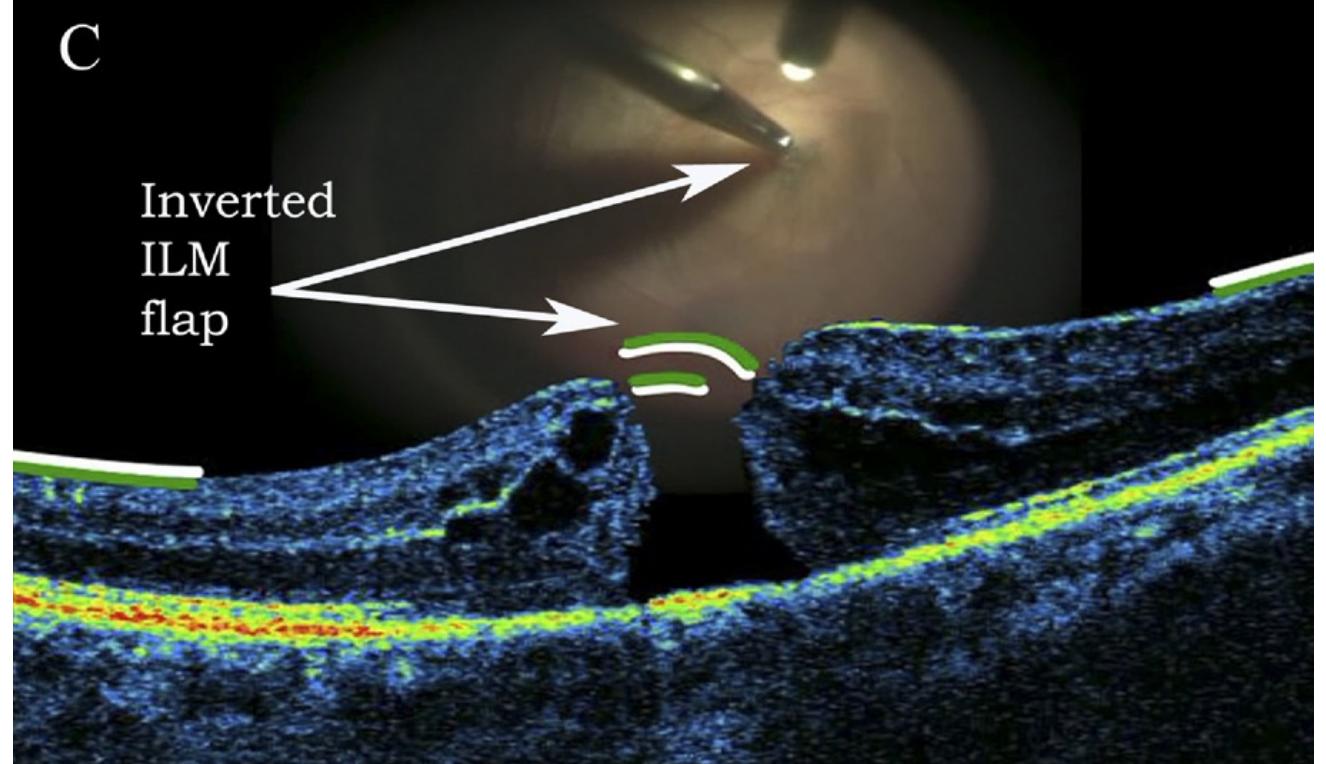
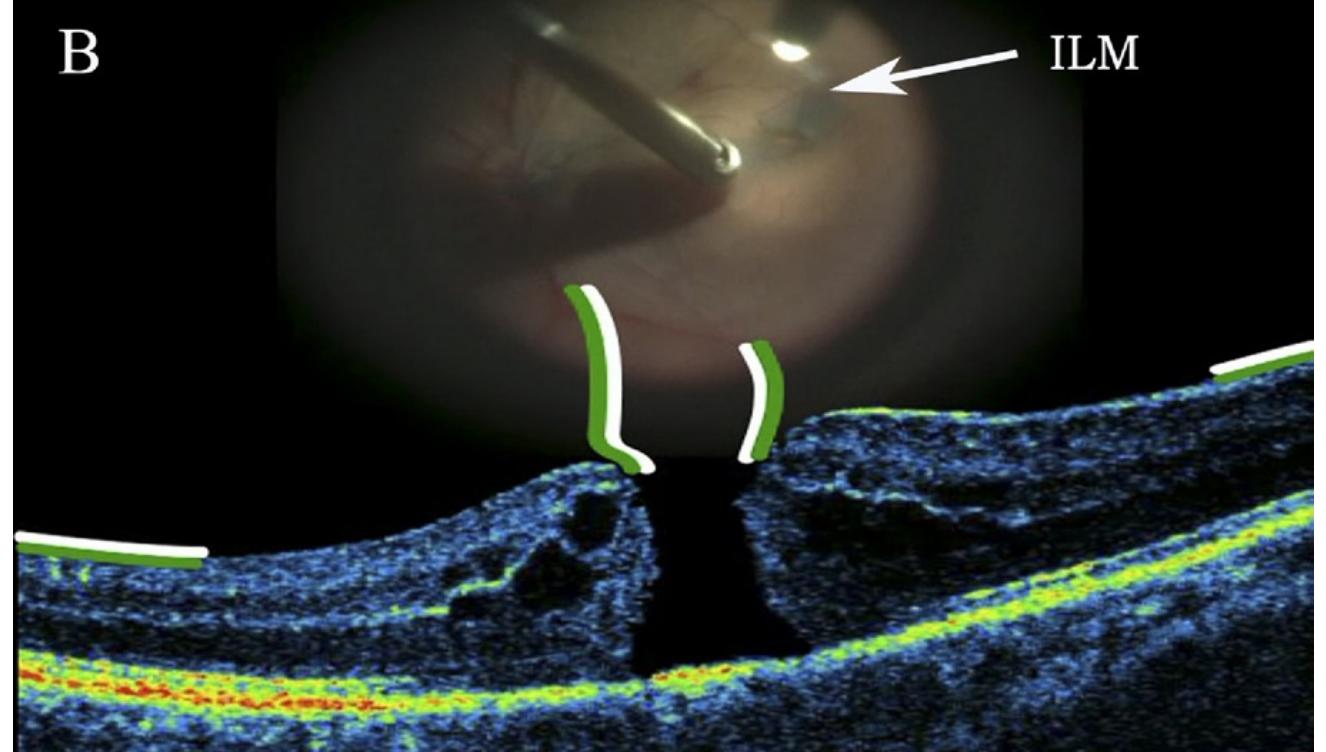
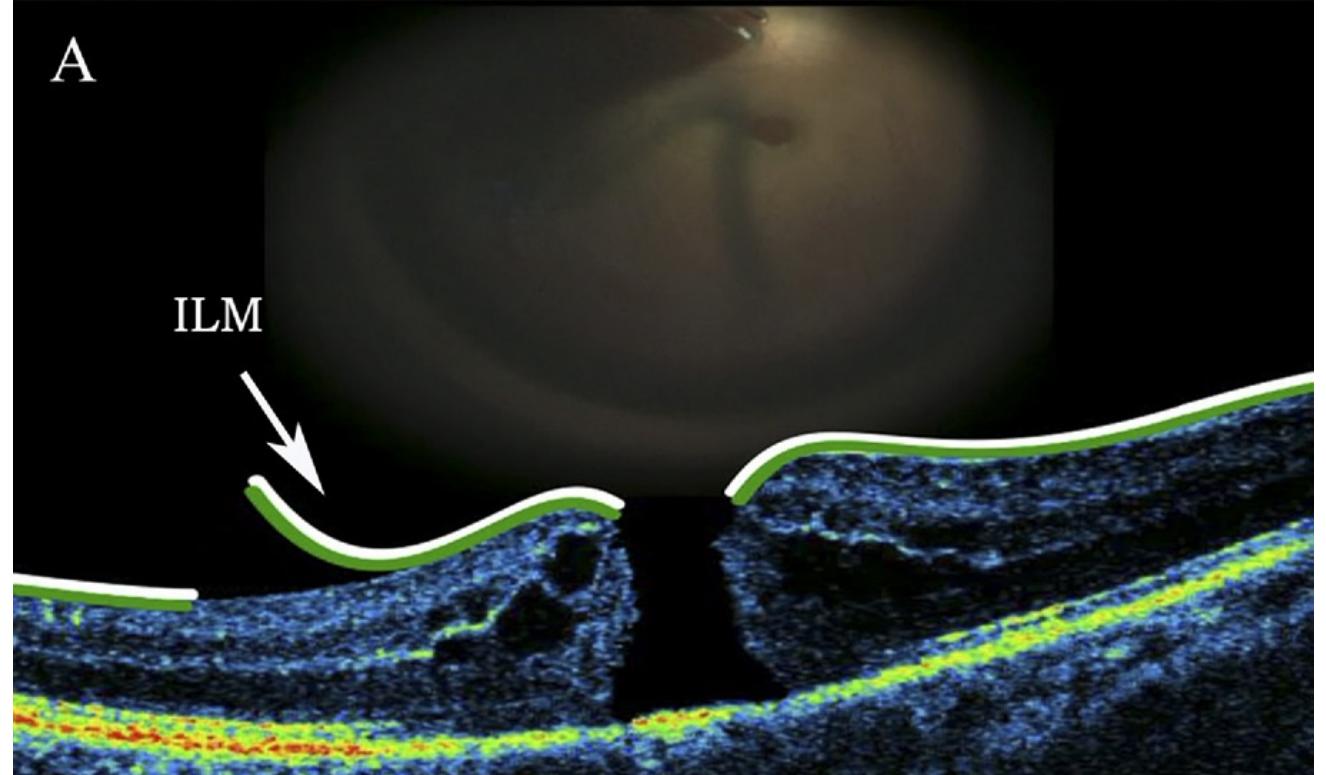


Macular Hole Retinal Detachment

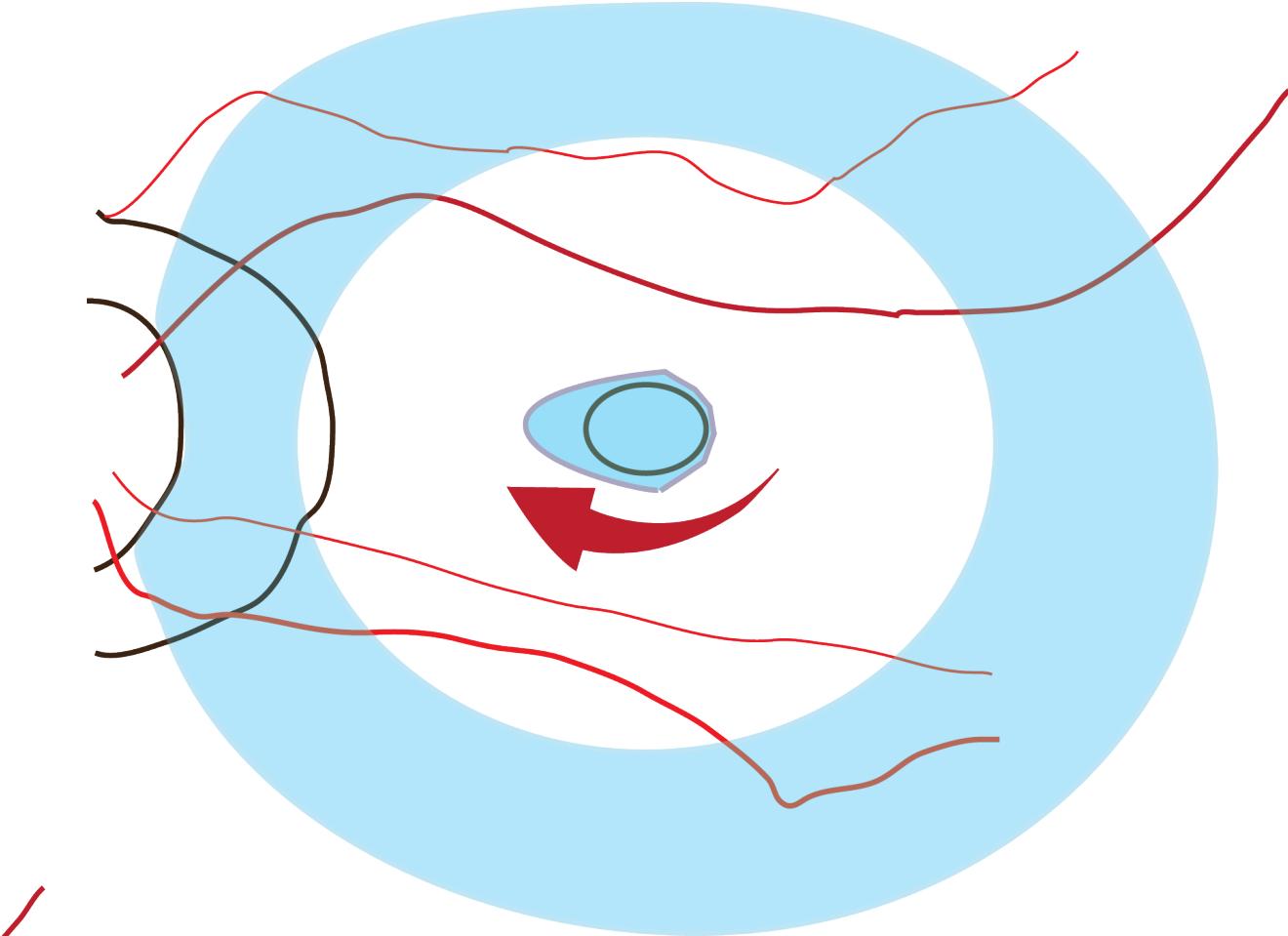


Inverted Internal Limiting Membrane Flap Technique for Large Macular Holes

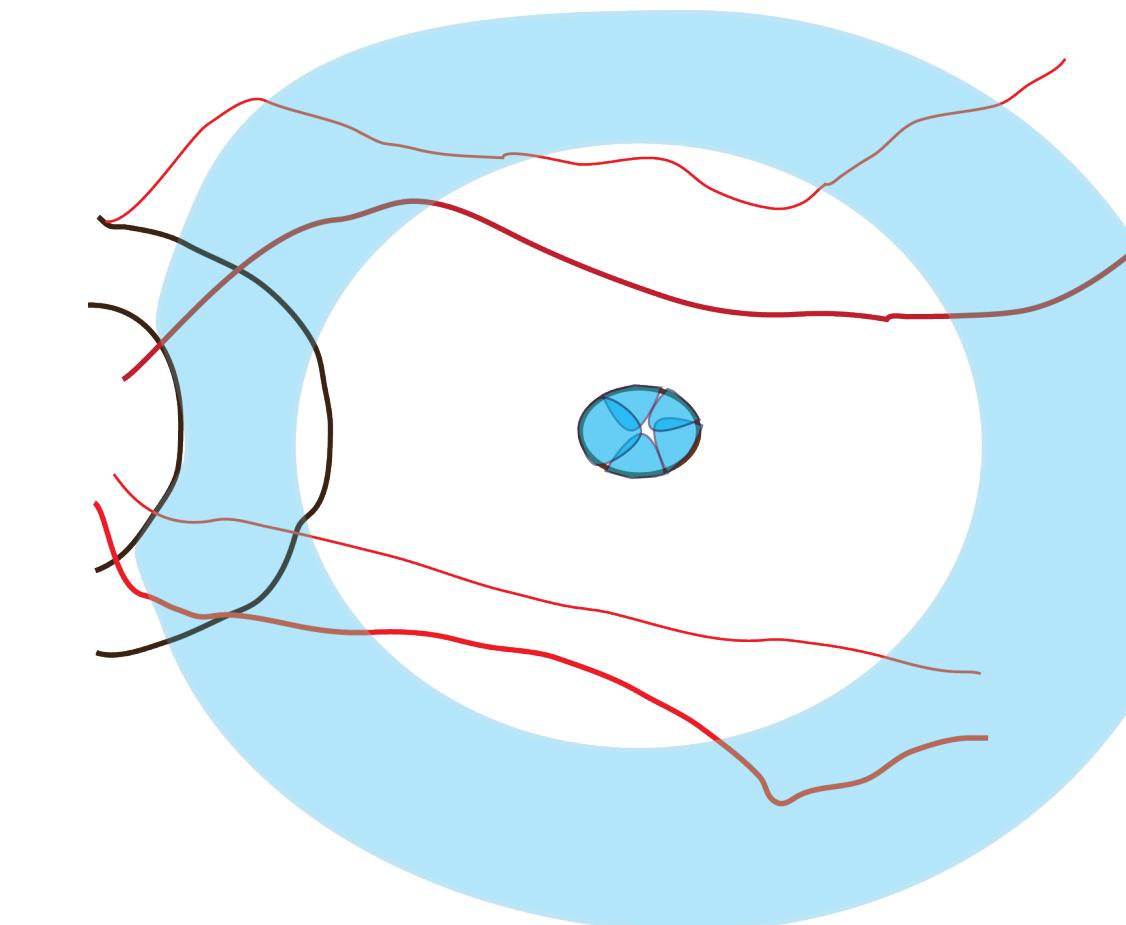
Zofia Michalewska, MD, PhD,¹ Janusz Michalewski, MD, PhD,¹ Ron A. Adelman, MD, MPH,²
Jerzy Nawrocki, MD, PhD¹ Ophthalmology 2010;117:2018–2025



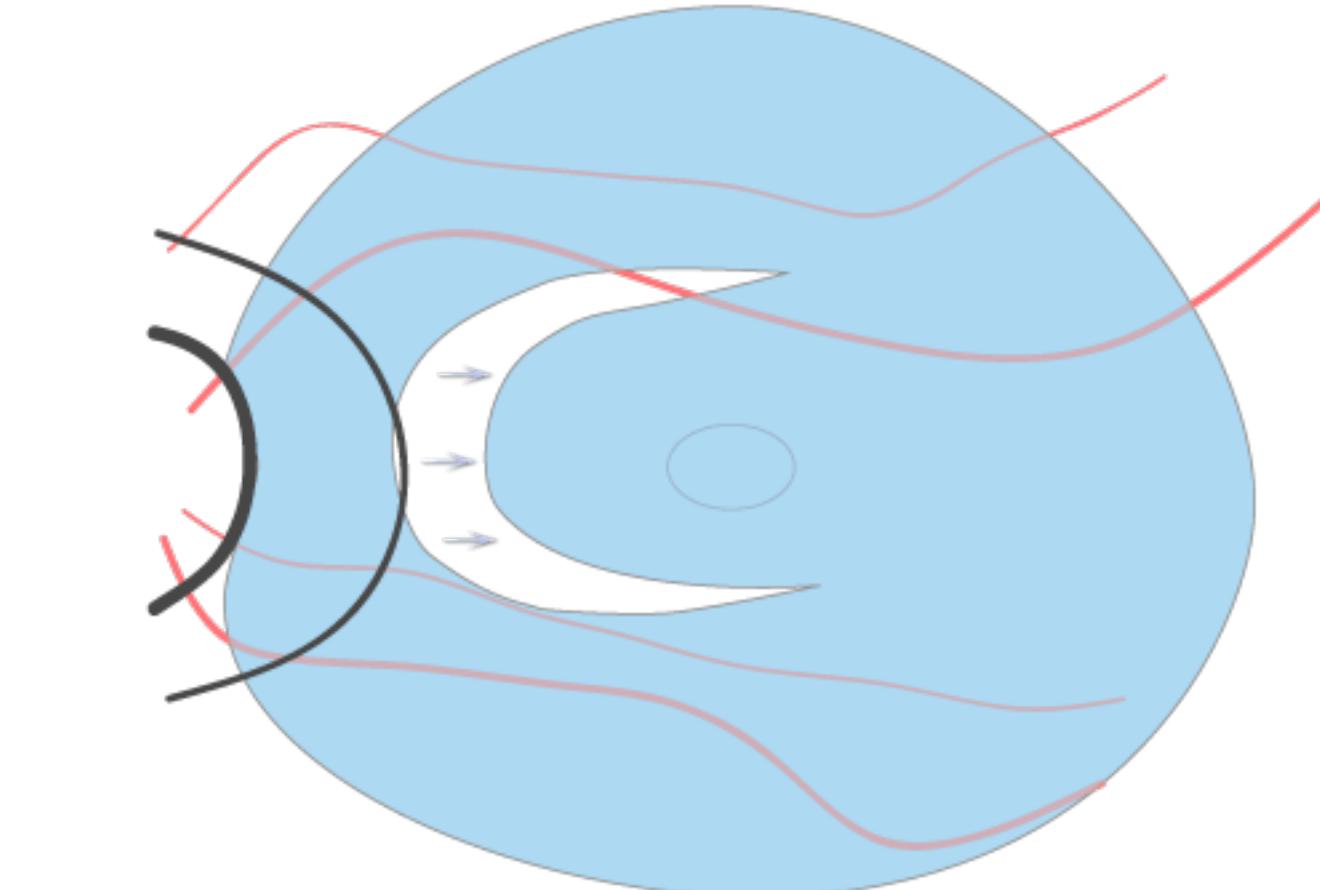
“Up to down”



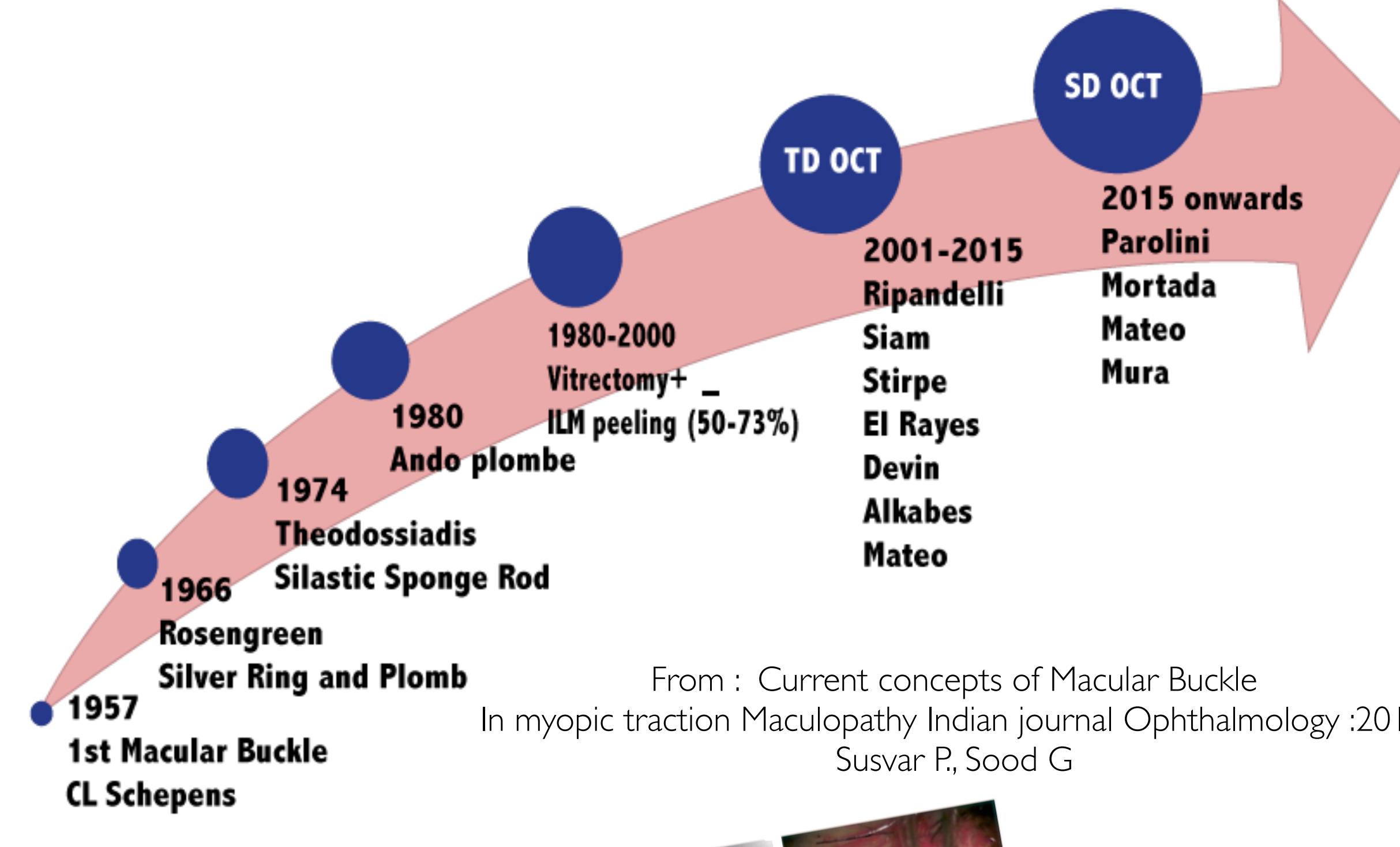
“Temporal to nasal”



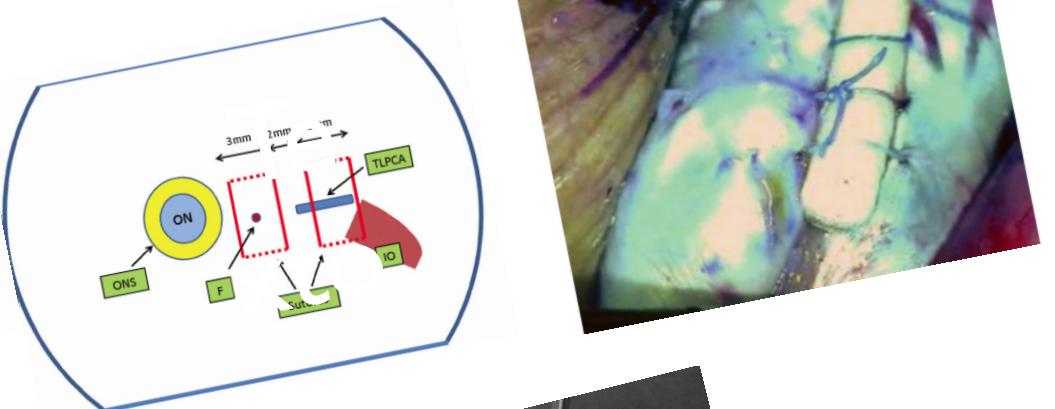
“Envelope”



“Retracting door”

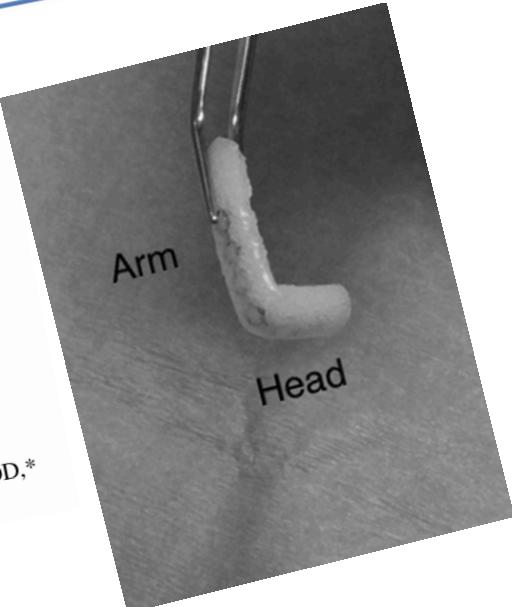


MACULAR BUCKLING FOR MYOPIC MACULAR HOLE RETINAL DETACHMENT
ABDEL LATIF HUSSEIN SIAM, FRCS(Edin),^{*} TAREK A. EL MAAMOUN, MD, FRCS,^{*}
MOHAMED HAMED ALI, MD, FRCS[†]
RETINA 32:748-753, 2012



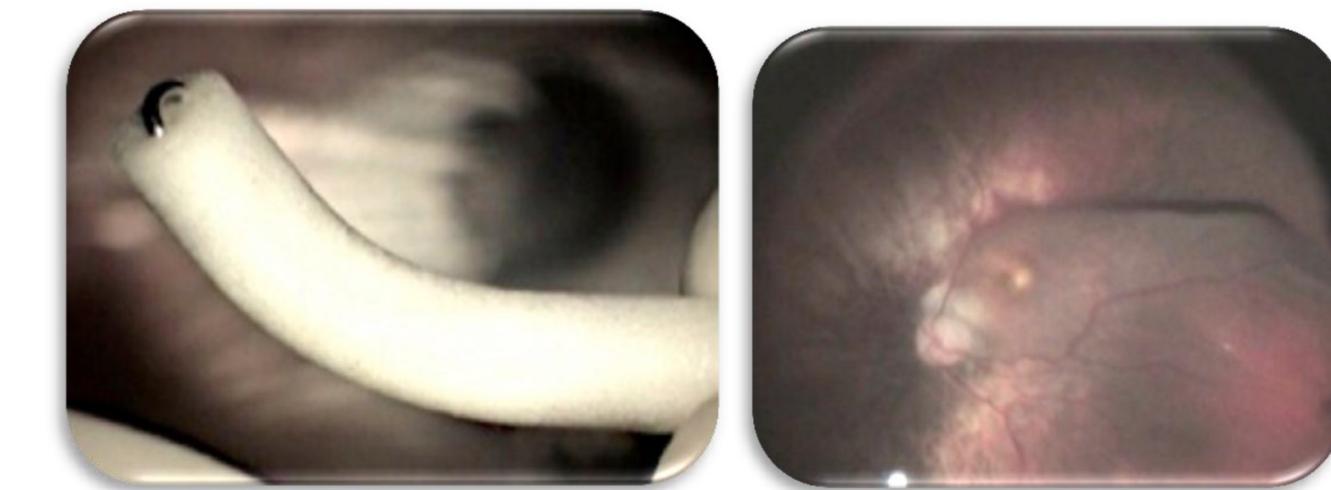
INDICATIONS AND RESULTS OF A NEW L-SHAPED MACULAR BUCKLE TO SUPPORT A POSTERIOR STAPHYLOMA IN HIGH MYOPIA

BARBARA PAROLINI, MD,* RINO FRISINA, MD,* SAJISH PINACKATT, MD,* ROBERTO GASPAROTTI, MD,† ENZA GATTI, MD,‡ ANDREA BALDI, MD,‡ ROBERTA PENZANI, OD,* ANGELA LUCENTE, OD,* FRANCESCO SEMERARO, MD‡



A Novel Episcleral Macular Buckling: Wire-Strengthened Sponge Explant for Recurrent Macular Hole and Retinal Detachment in High Myopic Eyes
Hassan A. Mortada, MD (2013)
Department of Ophthalmology, Kasr El Aini Hospital, Cairo University, Cairo, Egypt

“Successful retinal reattachment with improvement in visual acuity achieved in all 15 eyes”



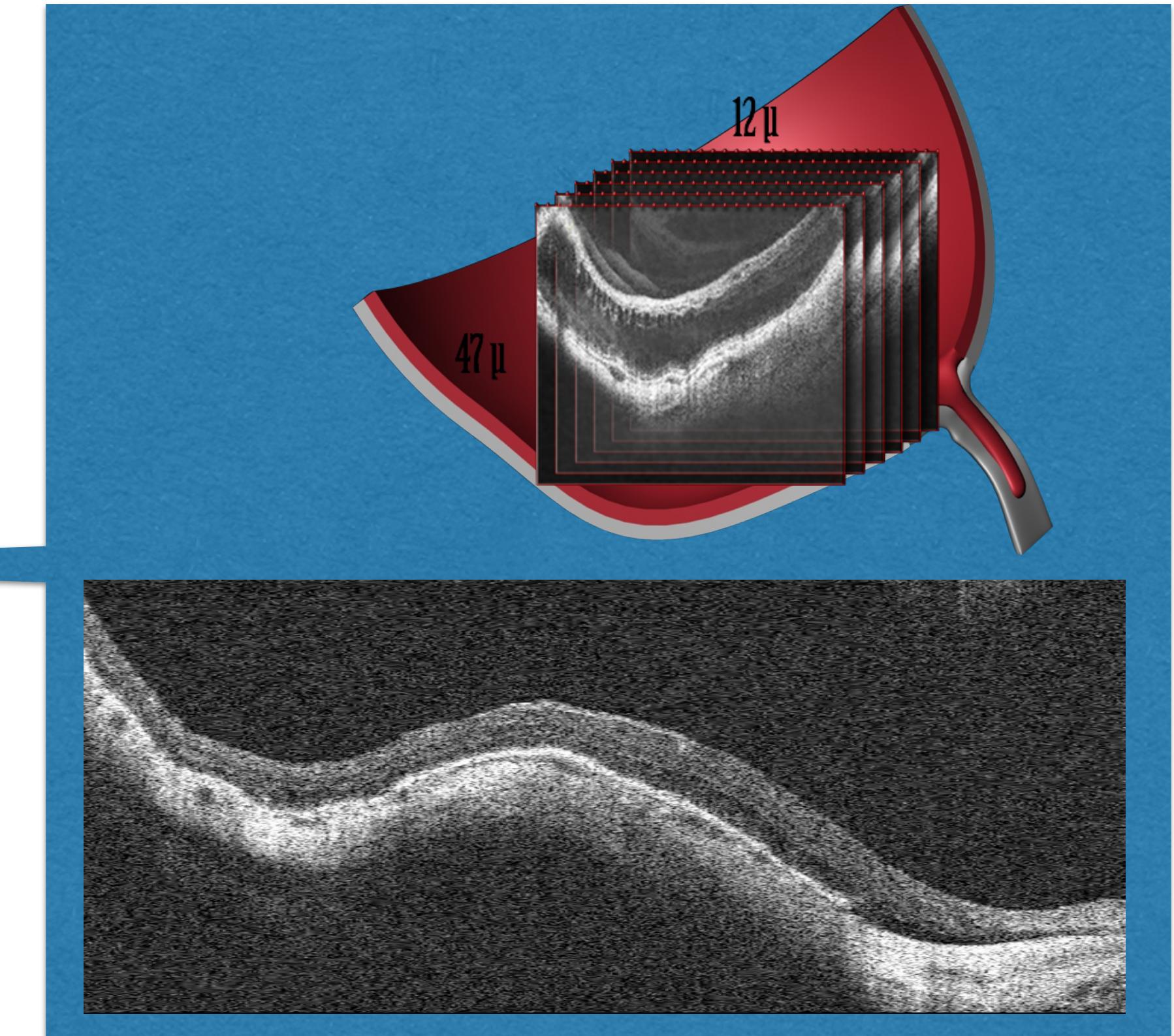
Goals of surgery

1.- Permanent
Retinal Reattachment

2.- Macular Hole Closure

3.- To Avoid Silicone Oil

4.- To improve vision



MACULAR HOLE & RETINAL DETACHMENT IN HIGH MYOPIA

PPV & ILM peeling

	Author.	year.	T	Nº	F/up	Tamponade	MH Closure	Reattch	Comments
PPV	Arias L	2015	R	15	19m	Sil Oil	60%	86%	> 30 mm .worst anatomical and visual prog.
PPV	Meng L	2014	R	21	22m	Sil Oil	86%	95%	52% High IOP. Redetachment (3/3) 100% of non-closed holes
PPV	Mancino R	2013	R	30	12m	c3f8 50% sil oil 50%	?	c3f8 94% sil oil54%	worst results in the sil oil group
PPV	Xie A	2013	R	28	-	Sil Oil	11%	75%	
PPV	Nadal J	2012	P	27	12m	Sil Oil	52%	85%	longer axial length ,worst results
PPV	Nishimura	2011	R	24	min29	Sil Oil	55%	92%	56% high IOP at six oil removal No differences in VA between open/closed holes

2010-2015 6 series with more than 10 cases showed

Macular hole closure was around half of the cases

Retinal reattachment was between 54% to 95%

Longer eyes (more than 30 mm) showed worst prognosis

Sil oil Tamponade could have a deleterious effect in visual prognosis
related to increased IOP, optic disc Atrophy or unknown reasons

MACULAR HOLE & RETINAL DETACHMENT IN HIGH MYOPIA

PPV & ILM. FLAP Technique

	Author.	year.	T	Nº	F/up	Tamponade	MH Closure	Reattach	Comments
PPV Inv.Flap	Chen S-N	2016	R	ILM-F:20 ILM-P:20	9m	c3F8	ILM-F:100 % ILM-P:35 %	ILM-F:100% ILM-P:100%	No difference in initial / final or visual improvement between both groups mean prep 0,020 (LogMar :1,72) mean postVA :0.06 (LogMar: 1,23)
PPV Inv Flap	Matsumura T	2016	R	ILM-F:10 ILM-P:12	12m	ILM-F:SO: 40% ILM-P:SO: 58%	ILM-F:90% ILM-P:33%	ILM-F:90% ILM-P:50%	ILM-F: mean prep 0,020 (LogMar :1,64) mean postVA :0.08 (LogMar: 1,086)
PPV Inv.Flap	Baba R	2017	R	ILM-F:10 ILM-P:11		c3F8	ILM-F:80% ILM-P:36%	ILM-F:100% ILM-P:91%	No advantage in visual outcome

Recently 3 series have shown comparative results btw ILM removal Vs ILM flap technique (Michalewska & Nawrocki)

Improving macular Hole closure and retinal reattachment in the ILM Flap

BUT

with poor if any improvement in VA

Yuan, J., Zhang, L.-L., Lu, Y.-J., Han, M.-Y., Yu, A.-H., & Cai, X.-J.. Vitrectomy with internal limiting membrane peeling versus inverted internal limiting membrane flap technique for macular hole-induced retinal detachment: [a systematic review of literature and meta-analysis](#). BMC Ophthalmology, 17(1), 1–11.(2017)

Vitrectomy with inverted ILM flap technique resulted significantly higher rate of retinal reattachment and macular hole closure than ILM peeling ,

but seemed

does not improve postoperative best-corrected visual acuity

MACULAR HOLE & RETINAL DETACHMENT IN HIGH MYOPIA

MB ± PPV

	Author.	year.	T	Nº	F/up	Tamponade	MH Closure	Reattch	Comments
PPV MB	Ripandelli	2001	R	PPV :20 ILM-P:20	12m	PPV:gas/siloil	PPV:26% MB : 93%	ILM-F:73% ILM-P:93%	Better visual prognosis in MB group
MB	Theodossiadis	2005	R	25	15 y	air	88%	100%	
MB	Ando	2007	R	30	4.4 y	air	83%	100%	
MB	Alkabes	2014	R	<u>21 primary</u> <u>21 (2^dsurgery)</u>	12m	20 sf6 1(temp sil oil)	81%	100%	Mean Pre op VA : 1.32 (0.05) mean post op VA : 0.76 (0.2-)
MB	Parolini	2015	R	10		sf6	60%	100%	Statistically significant VA improvement Mean Preop VA 20/500 ; Mean post op VA 20/100
MB	Mortada	2013	?	15	?	Gas/ Sil Oil	100%	100%	All cases showed improved BCVA

.... From the very beginning....techniques that involved Macular Buckles showed good results both
in macular hole closure and retinal reattachment

Even in improvement in VA

	No. of eyes (n)	F-up	AxL (millimeters)	Degree of myopia (SE)	Type of MB	Concomitant PPV	1° Surgery		2° Surgery		↑ BCVA post	Complications
							RR rate	MH closure rate	RR rate	MH closure rate		
Sasoh et al. [14]	33	33 months	29.6	N/A	Solid silicone MB with stainless steel wires (Ando Plombe)	No	94%	N/A	100%	N/A	60.6%	MB extrusion in 1 eye after 1 year
Ripandelli et al. [20]	15	12 months	N/A	-24.77	Solid silicone MB	No	93.3%	93.3%	100%	100%	100%	Intraoperative choroidal effusion in 1 eye
Theodossiadis et al. [21]	25	15 years	29.62	-12	Silicone Sponge	No	88%	N/A	100%	N/A	92%	Iatrogenic retinal tear in 1 eye. MB malpositioning in 1 eye
Tanaka et al. [27]	3	>1 year	27.9	-10.83	Ando Plombe (with titanium wires) ^a	No ^b	100%	66.6%	N/A	N/A	100%	Unreported
Ando et al. [22]	30	52.8 months	N/A	-14.48	Ando Plombe	No	93.3%	N/A	100%	83.3%	100%	Inadequate MB indentation requiring surgery in 2/30 failed eyes
Devin et al. [18]	11	>6 years	27 to 33	-9 to -31	Solid silicone MB (T-shaped)	No ^b	81.8%	N/A	N/A	N/A	27.3%	Intraoperative subretinal hemorrhage and hemorrhagic choroidal detachment (1 eye each)
Siam et al. [28]	26	N/A	N/A	N/A	Silicone sponge	No ^b	100%	N/A	N/A	N/A	N/A	Vascular injury in 2 eyes. Perforation in 3 eyes. MB malpositioning in 1 eye. Intraoperative prolapse of orbital fat in 6 eyes. Perforation in 1 eye. Submacular hemorrhage in 1 eye
Mortada [24]	15	N/A	> 30	N/A	Silicone sponge with stainless steel wire (L-shaped MB)	Yes ^b	100%	N/A	N/A	N/A	100%	Unreported
Tian et al. [19]	5	>3 months	N/A	-11.6	Silicone sponge	No ^b	100%	40%	N/A	N/A	N/A	Intraoperative hyphema in 1 eye
Alkabes et al. [23] (Untreated MHR-D)	21	19.3 months	N/A	-16.2	Ando Plombe	Yes	95%	81%	100%	=	81%	RPE disturbance
	21	21.3 months	N/A	-17.8		Yes ^b	90.5%	57%	=	=	71%	
Qi et al. [30]	5	15.6 months	31.25	-23.5	Donor sclera	No ^c	100%	100%	N/A	N/A	100%	None
El Rayes [25]	12	>1 year	33	-19	Suprachoroidal catheterism with long-acting hyaluronic acid	Yes ^b	100%	83%	N/A	N/A	66.6%	Intraoperative choroidal and subretinal hemorrhage requiring reintervention with rTPA injection in 1 eye. RPE changes in 2 eyes
Parolini et al. [16] 5	10	3 years	32.96 (8/15)	N/A	Silicone sponge with stainless steel wire (L-shaped MB)	Yes	100%	60%	N/A	N/A	100%	MB extrusion requiring surgery in 1 case. Optic nerve kinking requiring MB removal in 1 eye
			30.42	N/A		No	100%	60%	N/A	N/A	100%	
Bedda et al. [29]	20	15.8 months	30.63	N/A	Ando Plombe	No	100%	40%	N/A	N/A	49.4%	Scleral perforation in 3 eyes and MB malpositioning in 1 eye
Mura et al. [26]	11	>3 months	31.5	N/A	Solid silicone MB (T-shaped)	Yes ^b (in 8 cases)	100%	100%	N/A	N/A	72.7%	None
Forlini et al. [17]	4	19.5 months	30.9	N/A	Solid silicone MB (Adjustable)	No (except in 1 case)	100%	100%	N/A	N/A	75%	None

MACULAR HOLE & RETINAL DETACHMENT IN HIGH MYOPIA

MB + PPV & ILM peeling

Versus

PPV & ILM peeling

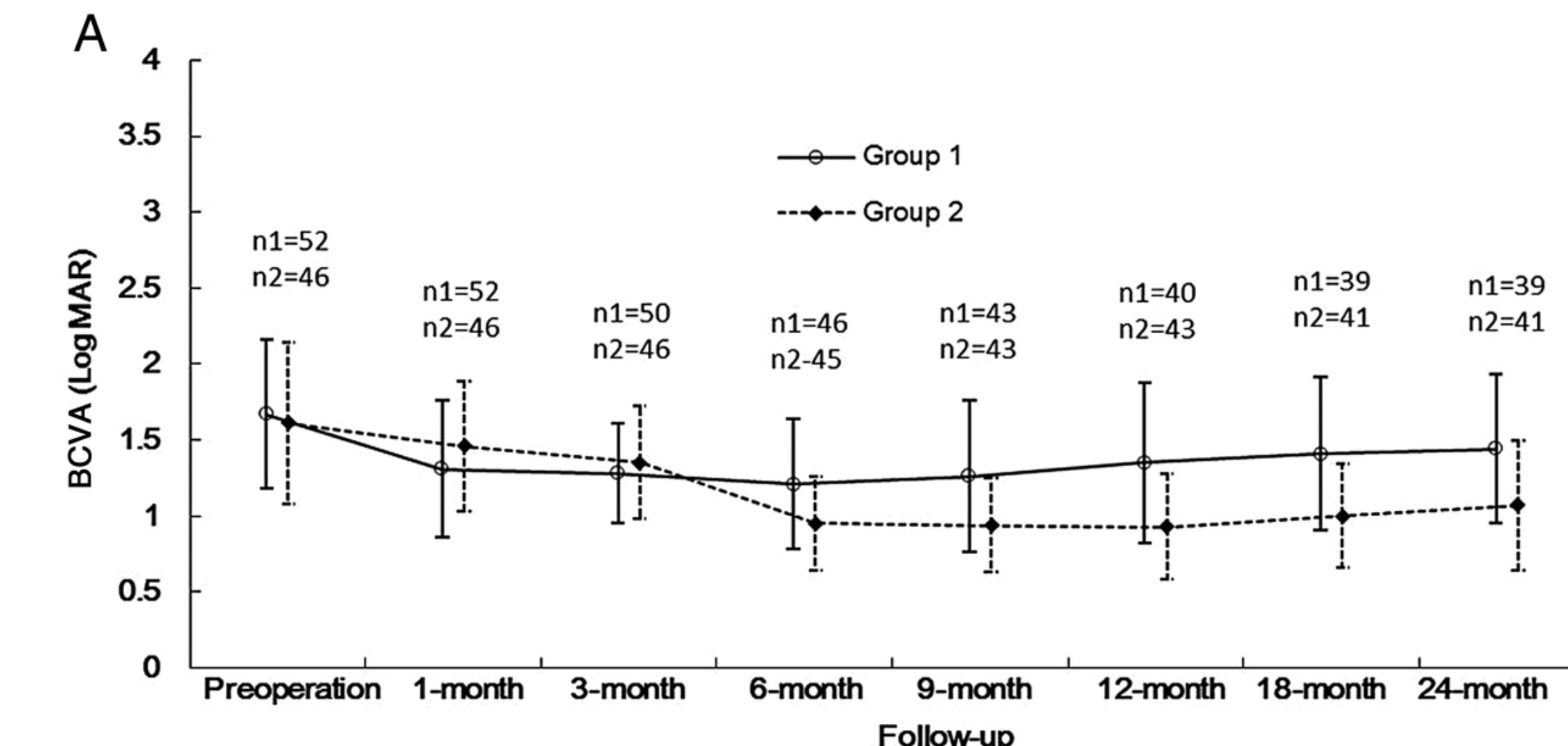
Ma, J., Li, H., Ding, X., Tanumiharjo, S., & Lu, L. (2017). Effectiveness of combined macular buckle under direct vision and vitrectomy with ILM peeling in refractory macular hole retinal detachment with extreme high axial myopia: a 24-month comparative study. BJO, 101 1386–1394

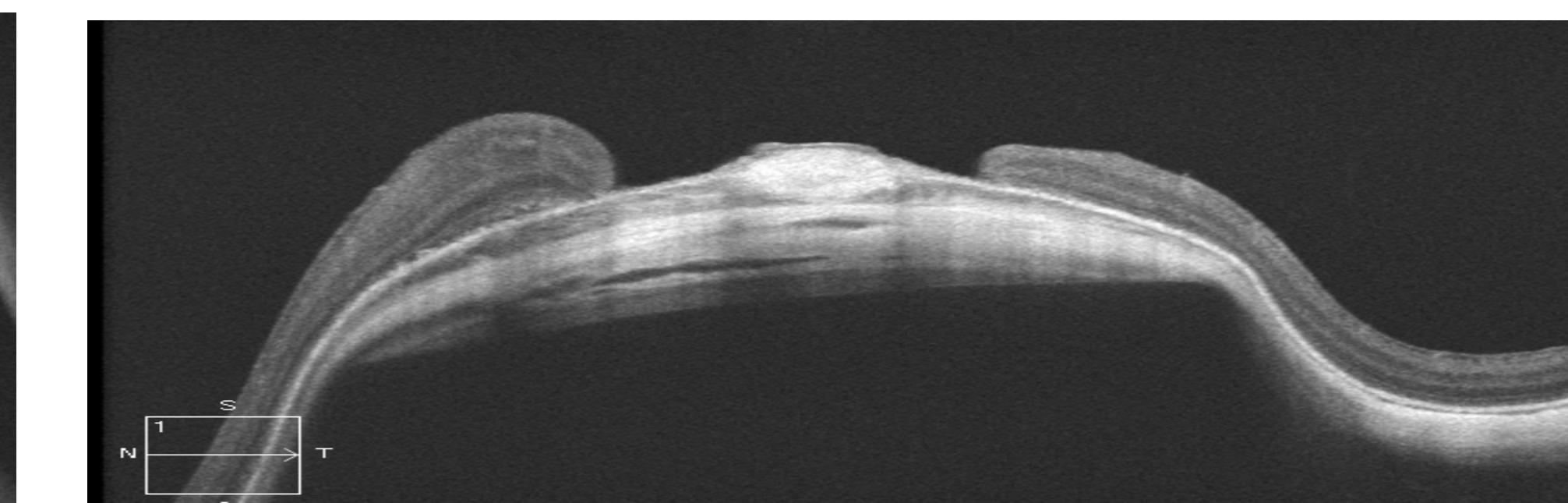
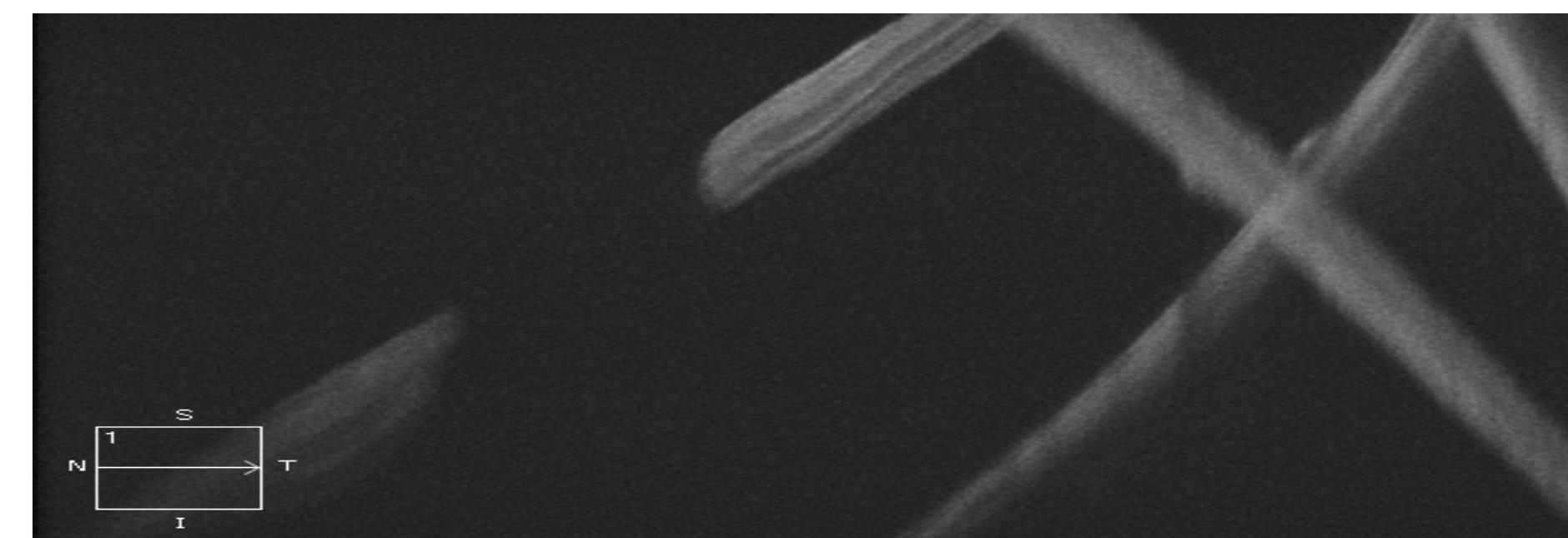
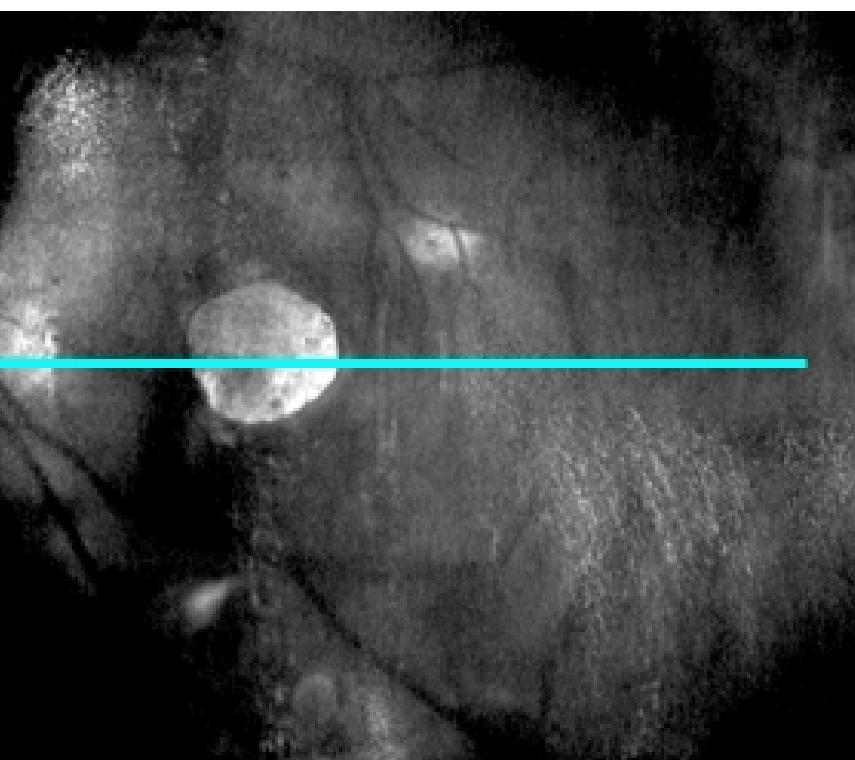
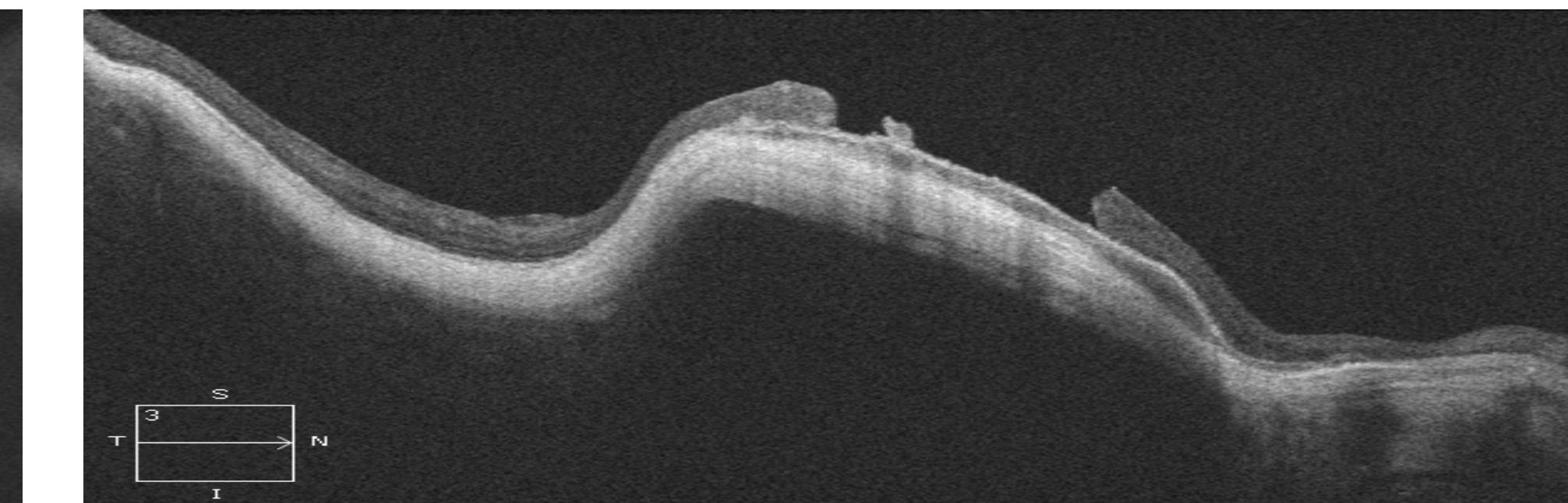
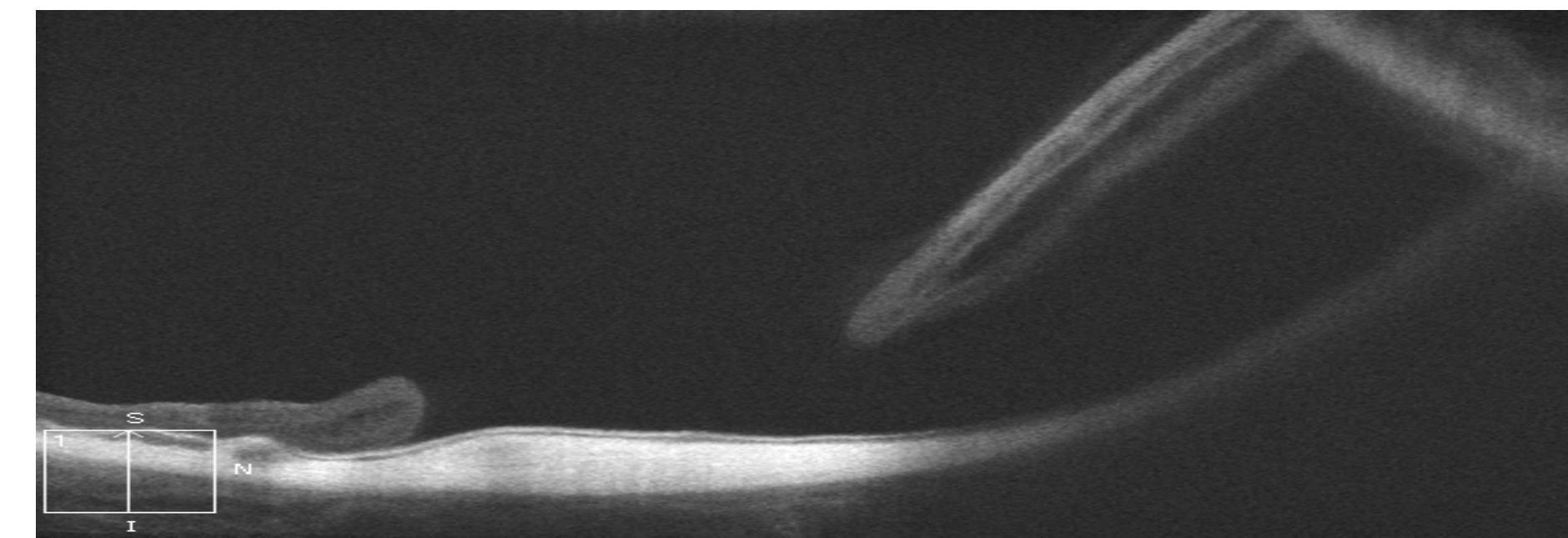
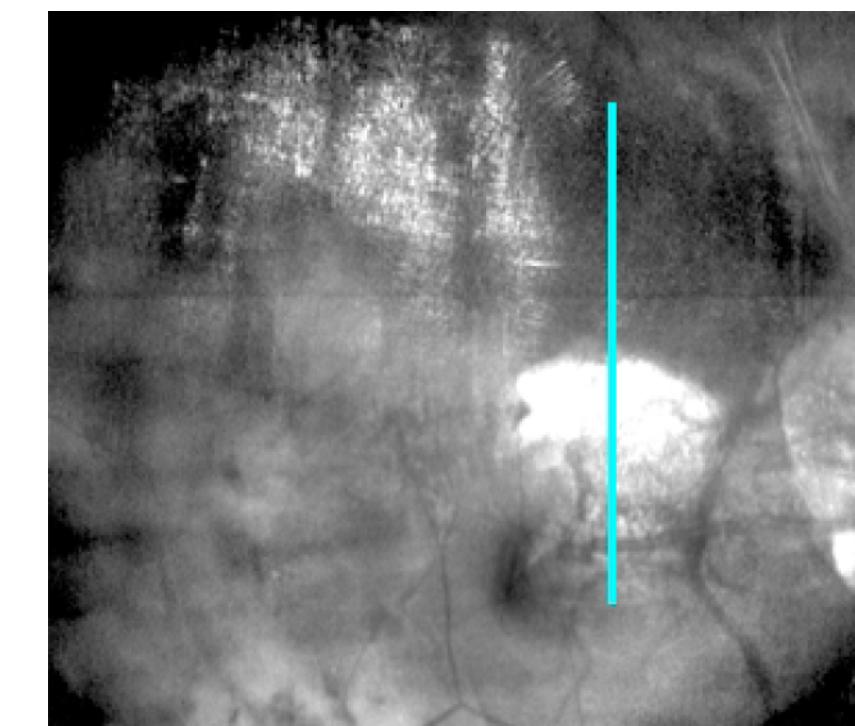
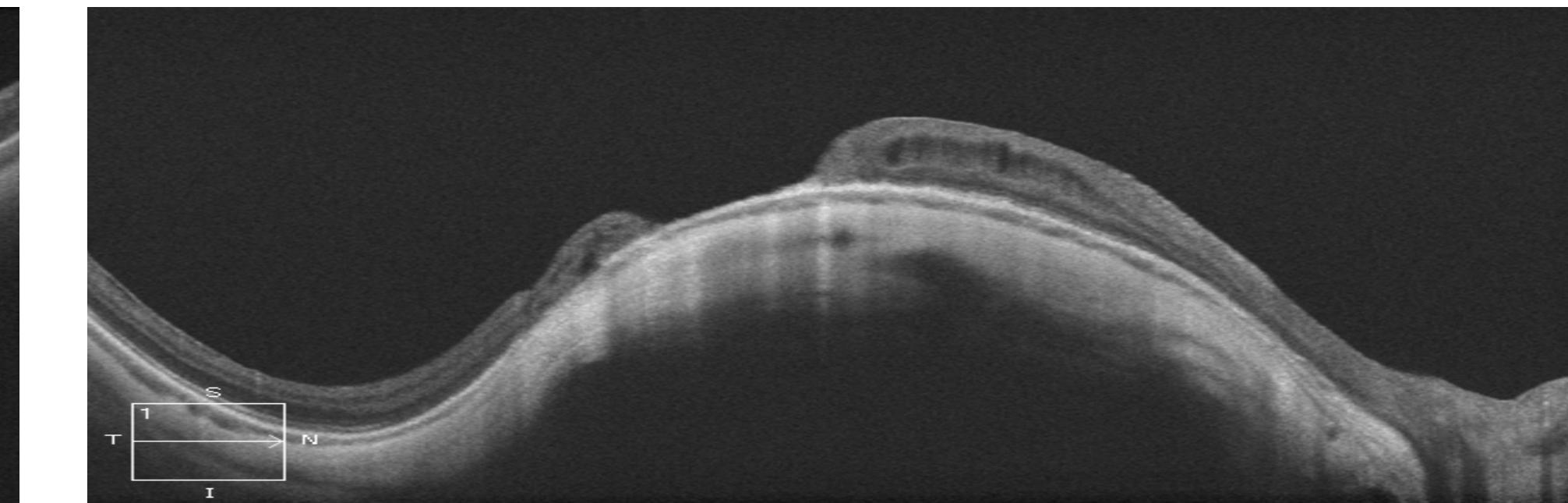
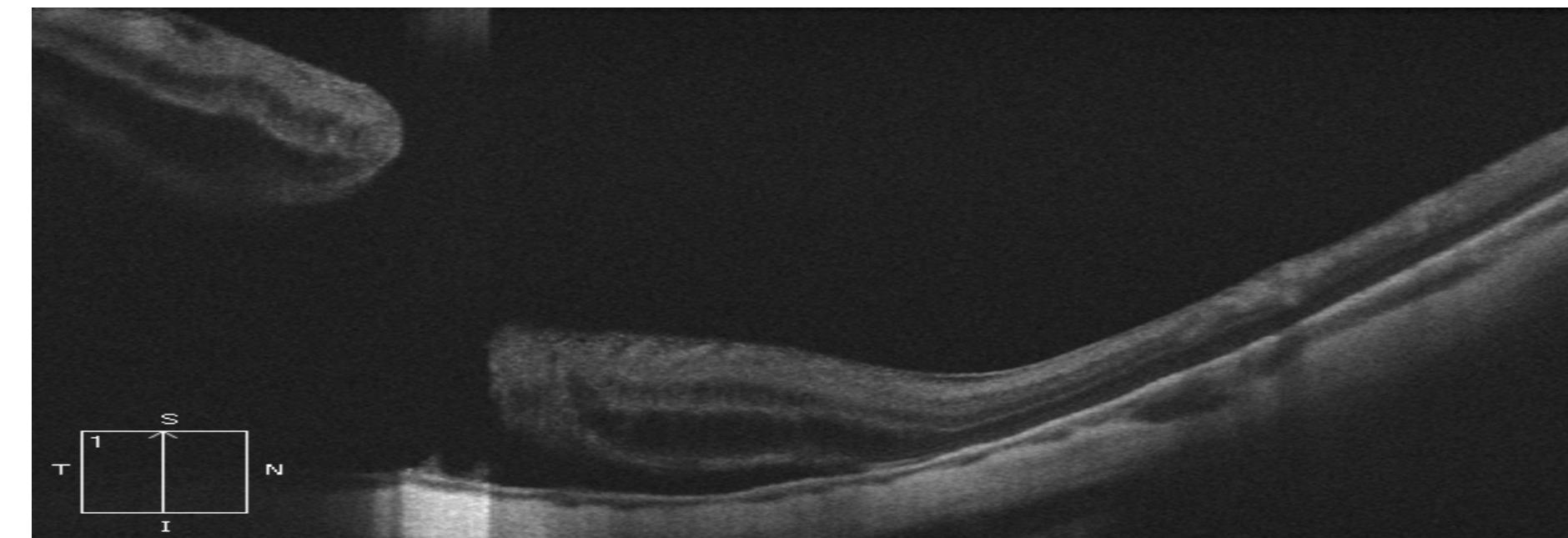
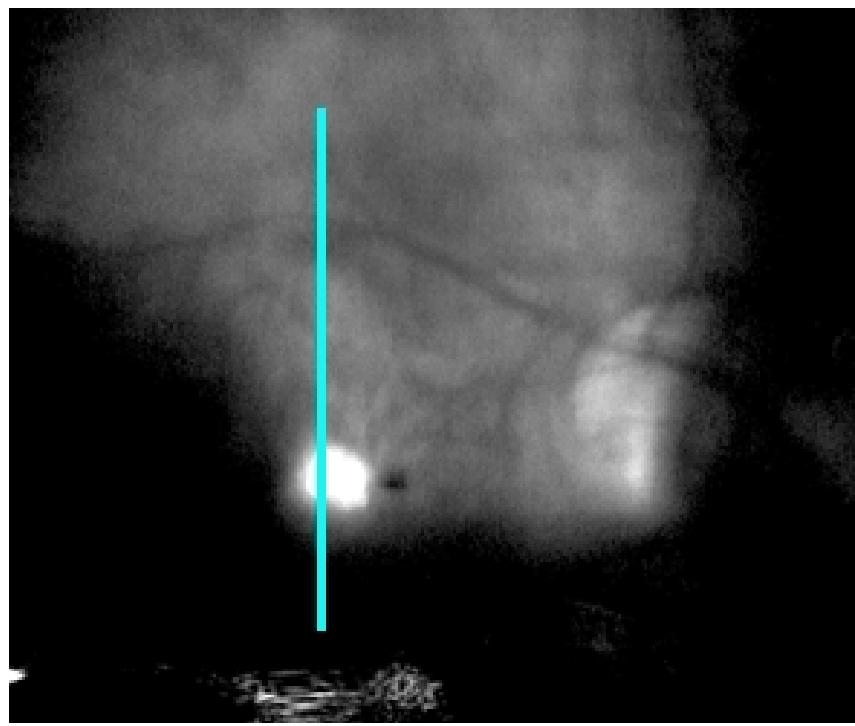
Prospective , Randomized study ,98 eyes with Macular Hole retinal detachment (> 30 mm Axial L)

Reattachment rate was significantly higher at 12 months in the combined group (MB+PPV& ILM Peeling)

Macular Hole closure rate was significantly higher in the combined group (MB+PPV& ILM Peeling)

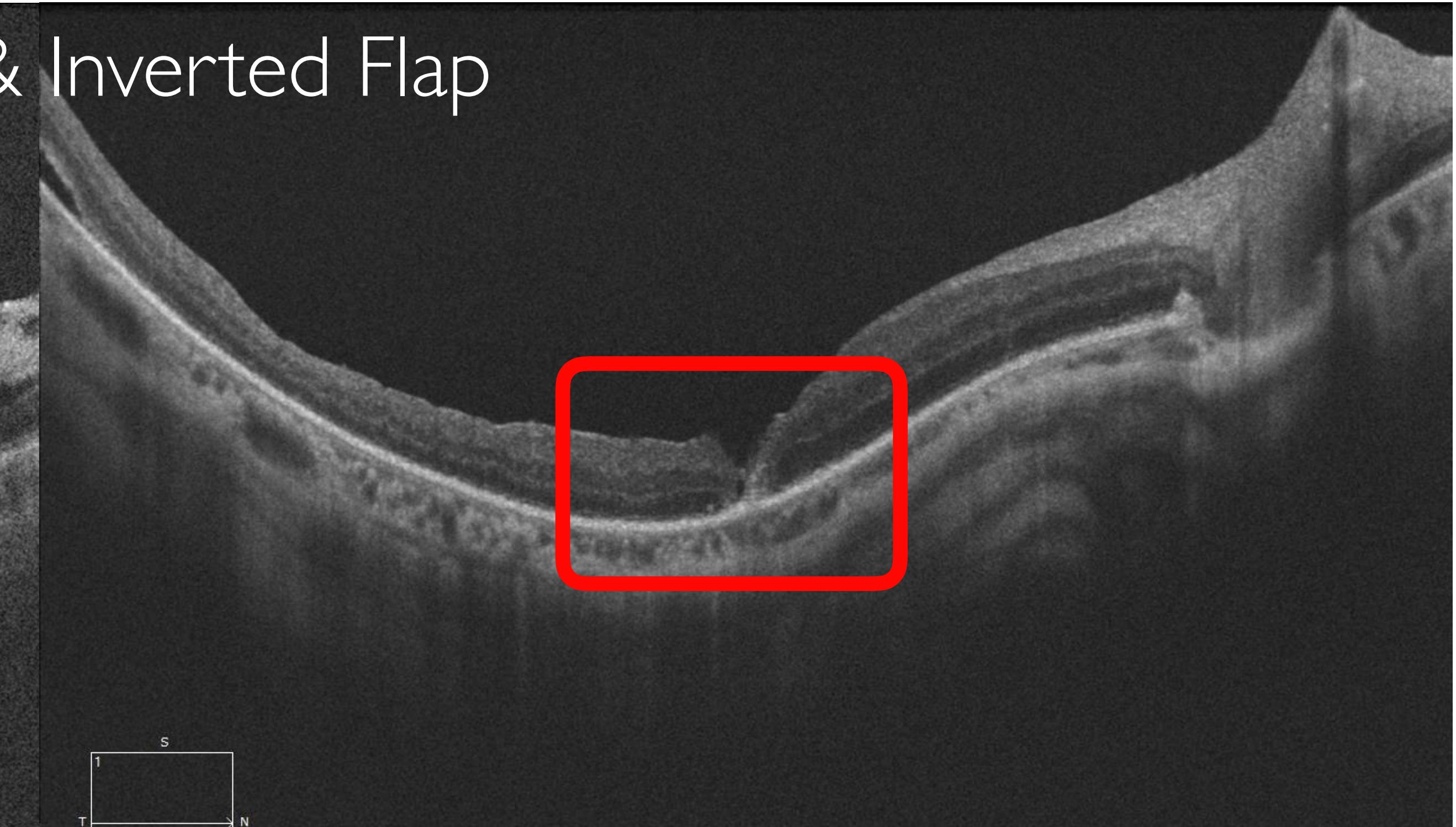
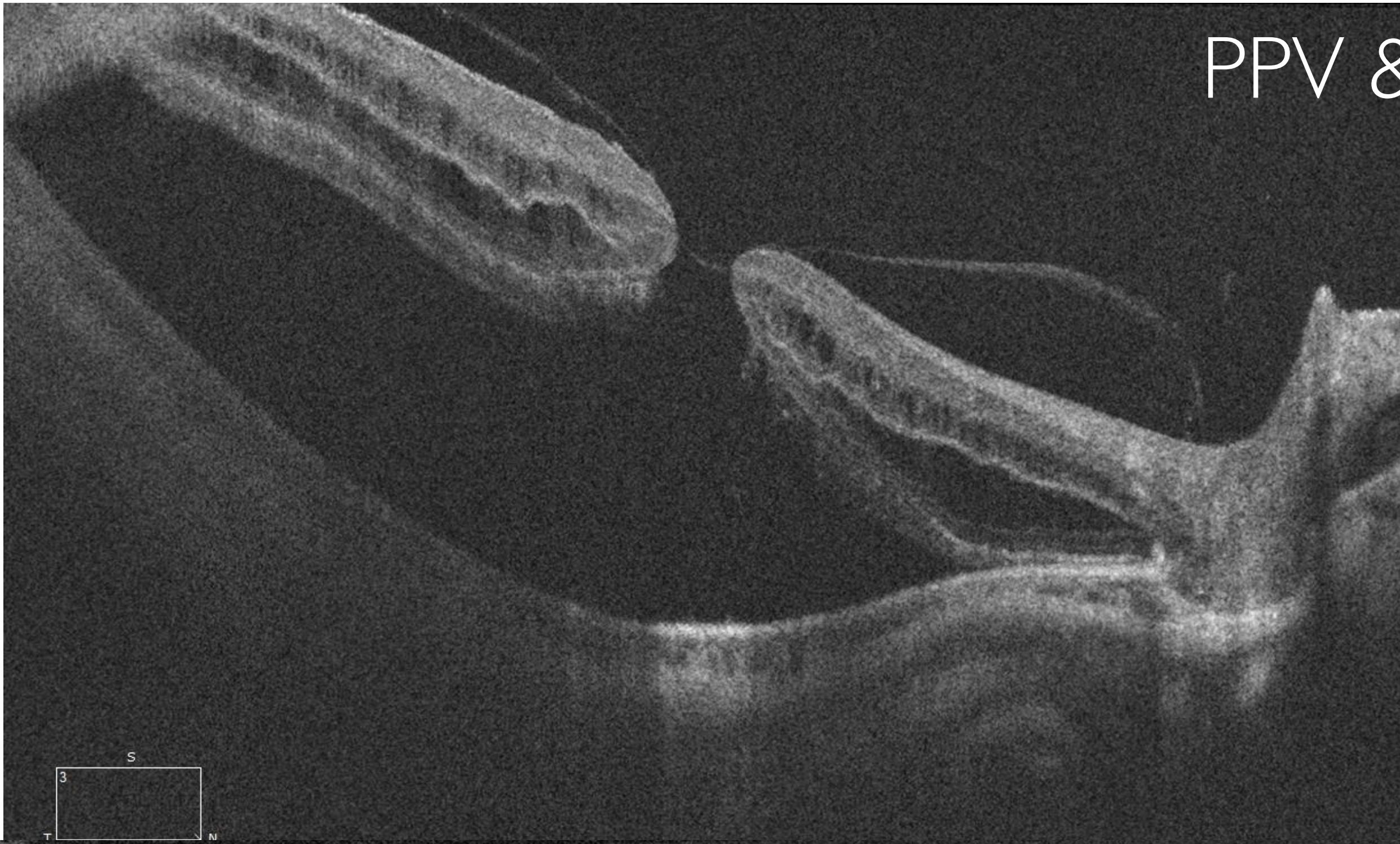
Combined buckle/PPV surgery had achieved greater VA improvement since 6th month postoperatively.



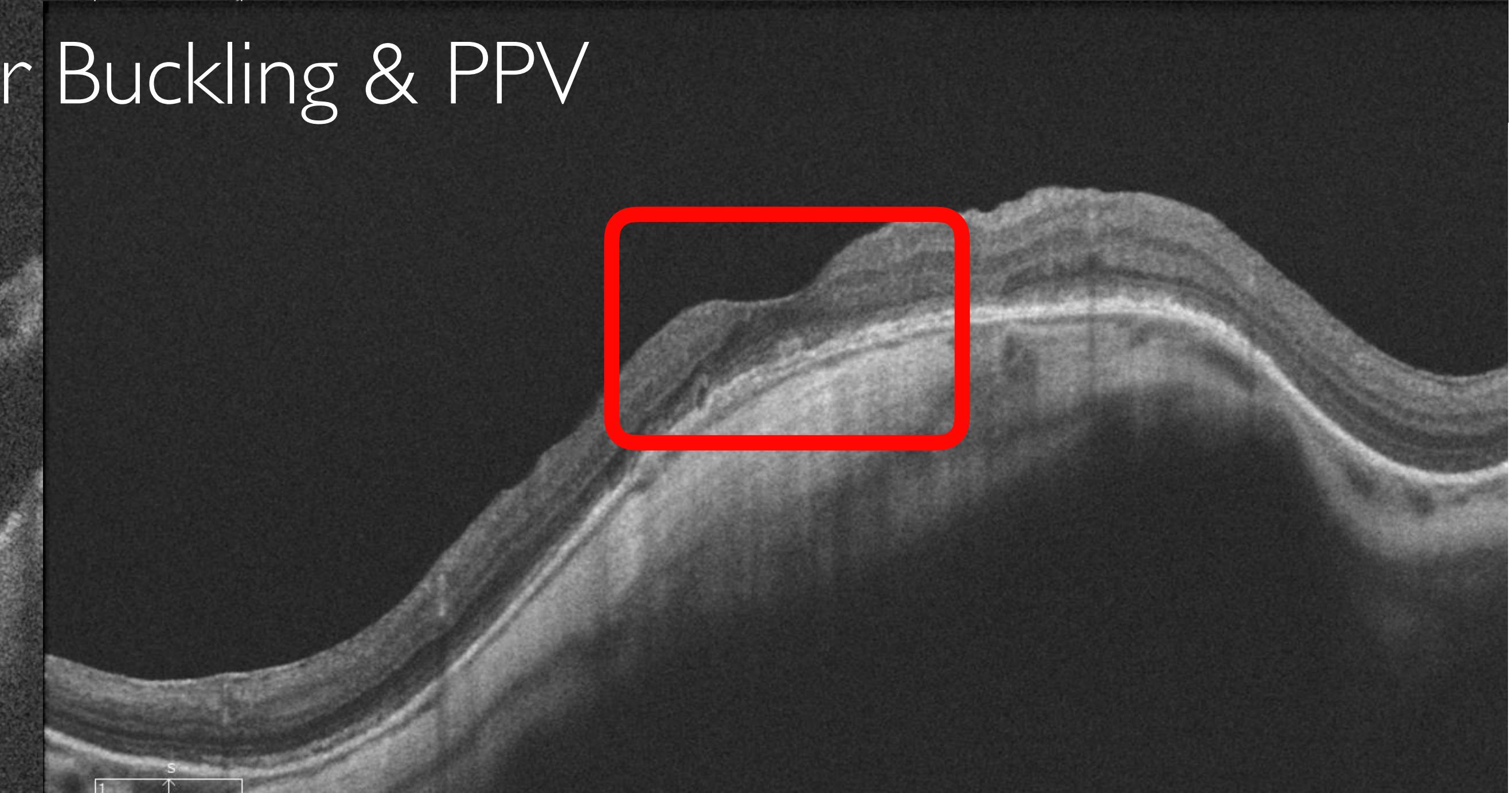
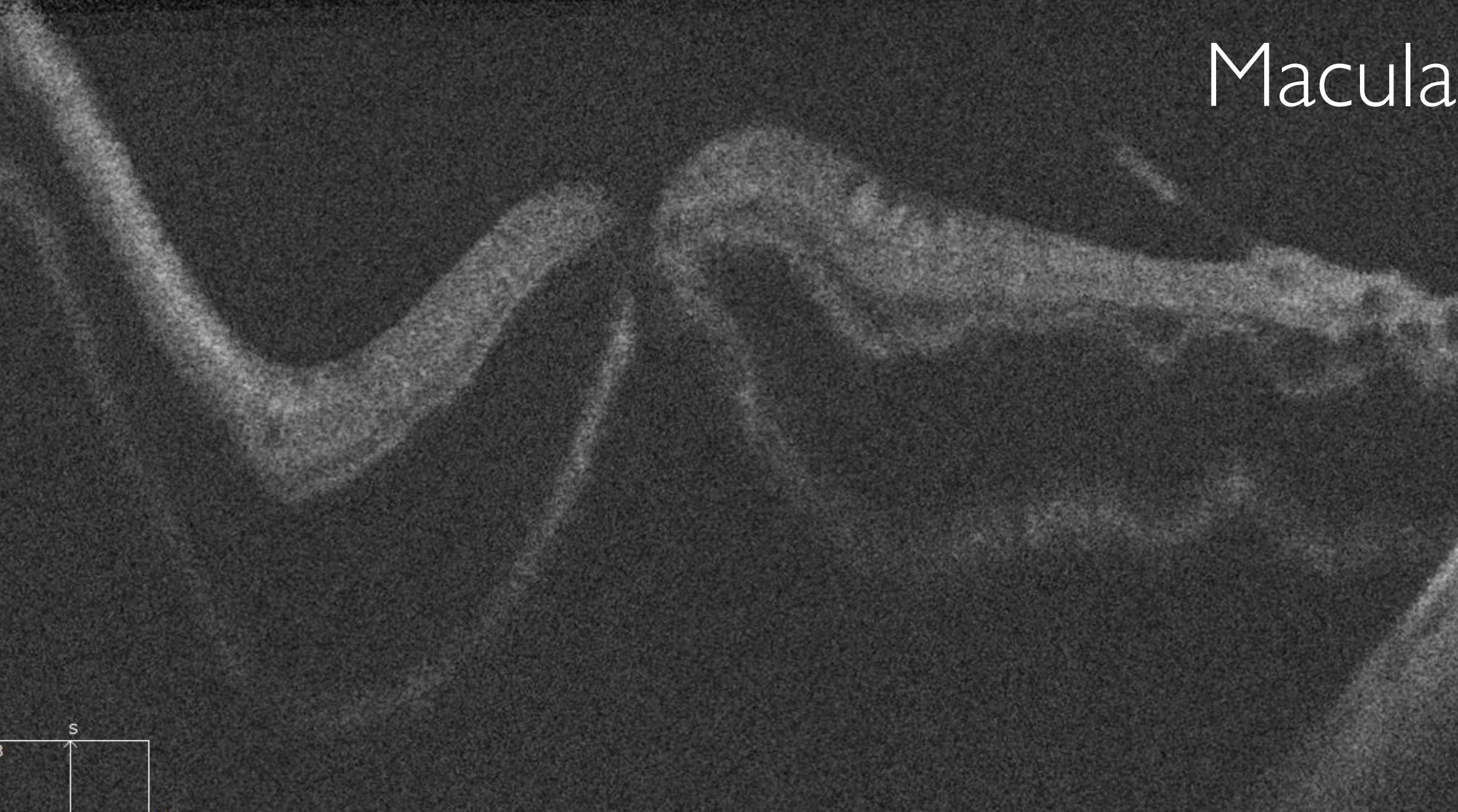


With the Macular Buckle... even in cases with large MH ...
permanent reattachment

PPV & Inverted Flap

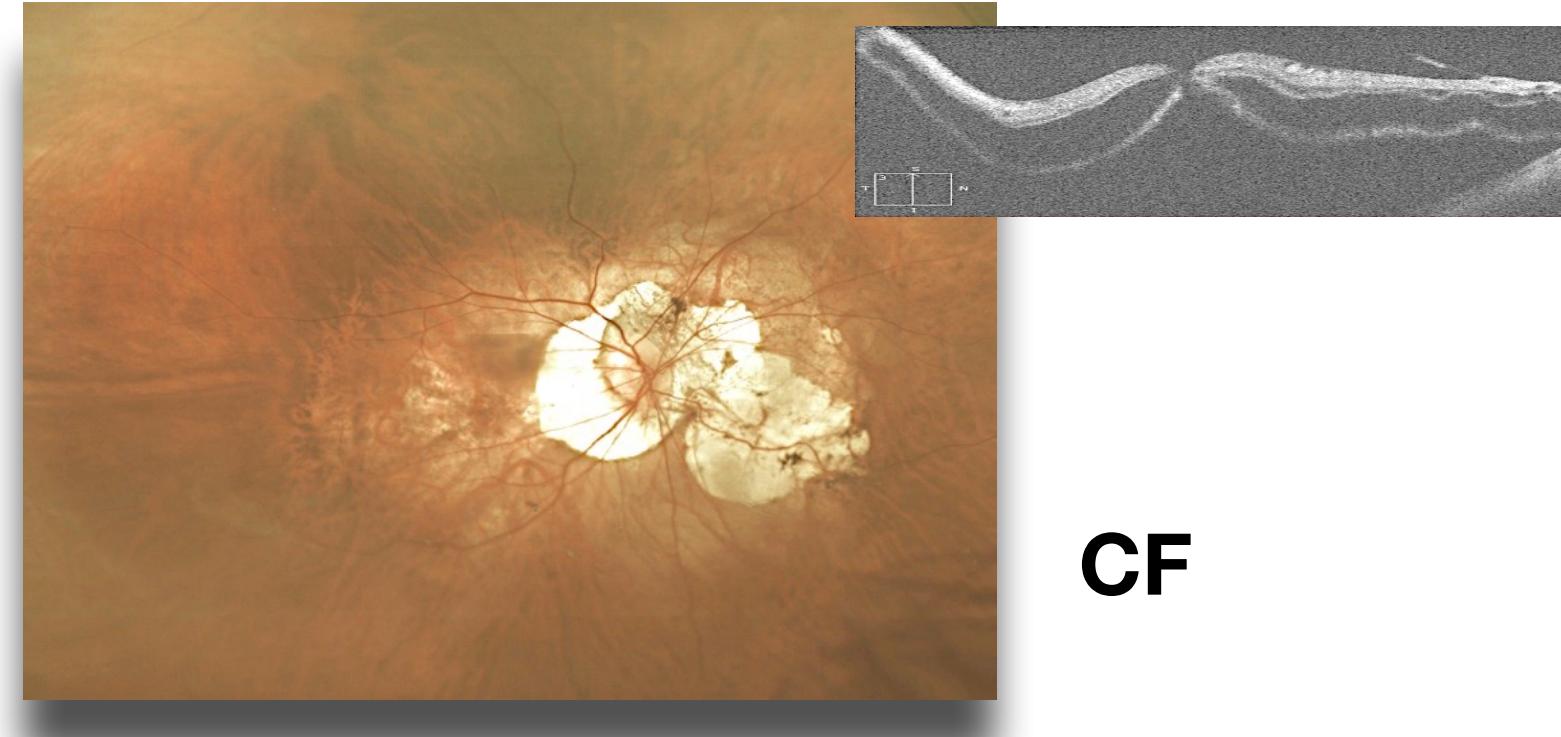


Macular Buckling & PPV

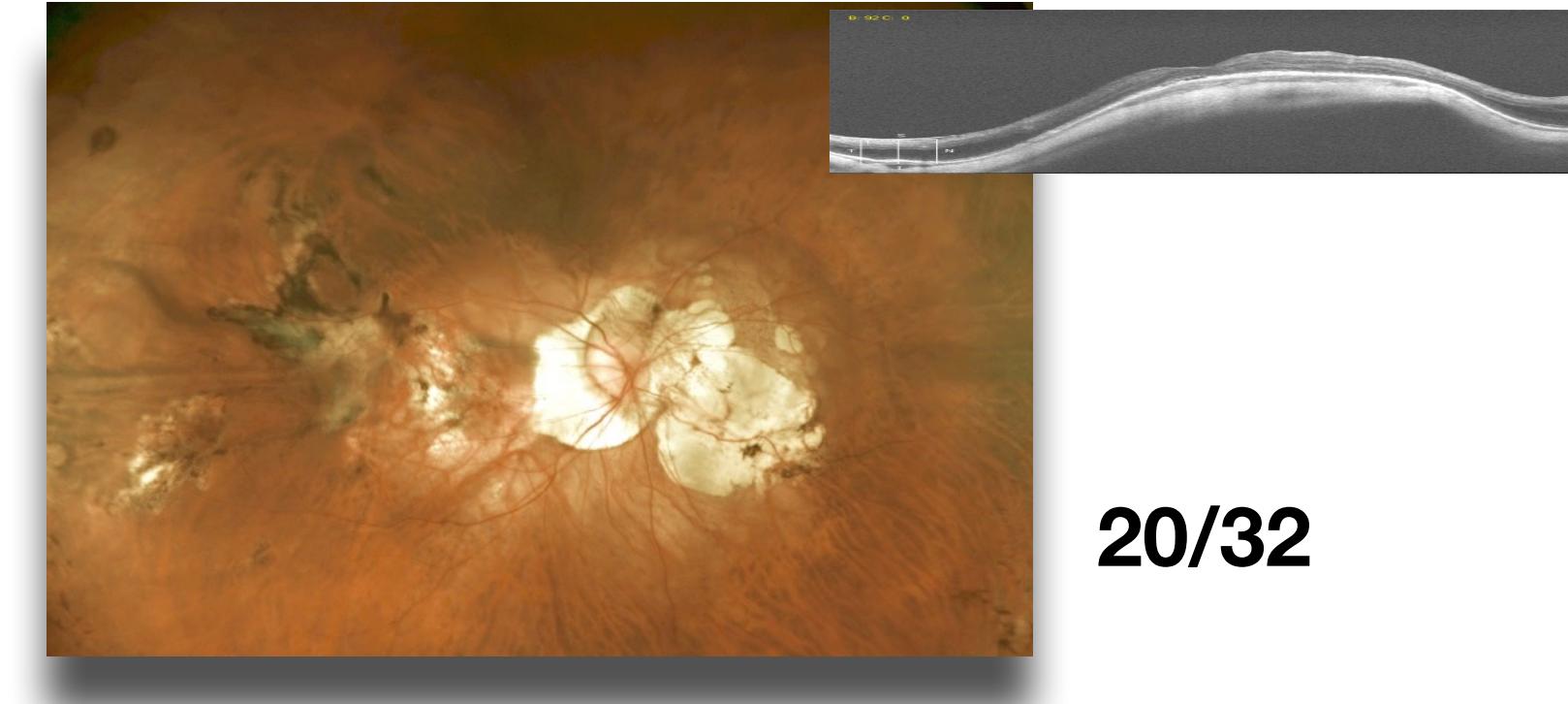


Macular Buckling Complications

RPE disturbance / atrophy



CF



20/32

Buckle Extrusion

Very rare in commercial buckles , more frequent in "Domestic Made" Buckles

Choroidal Hemorrhage

More frequent in "nasal to nasal buckles" , very rare in "one quadrant" buckles

Serous foveal detachment mimicking dome shape macula

Rare but more frequent in Ando plombe due to squared borders of the indenting platform

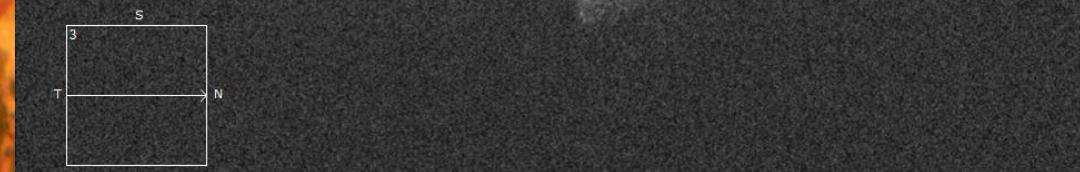
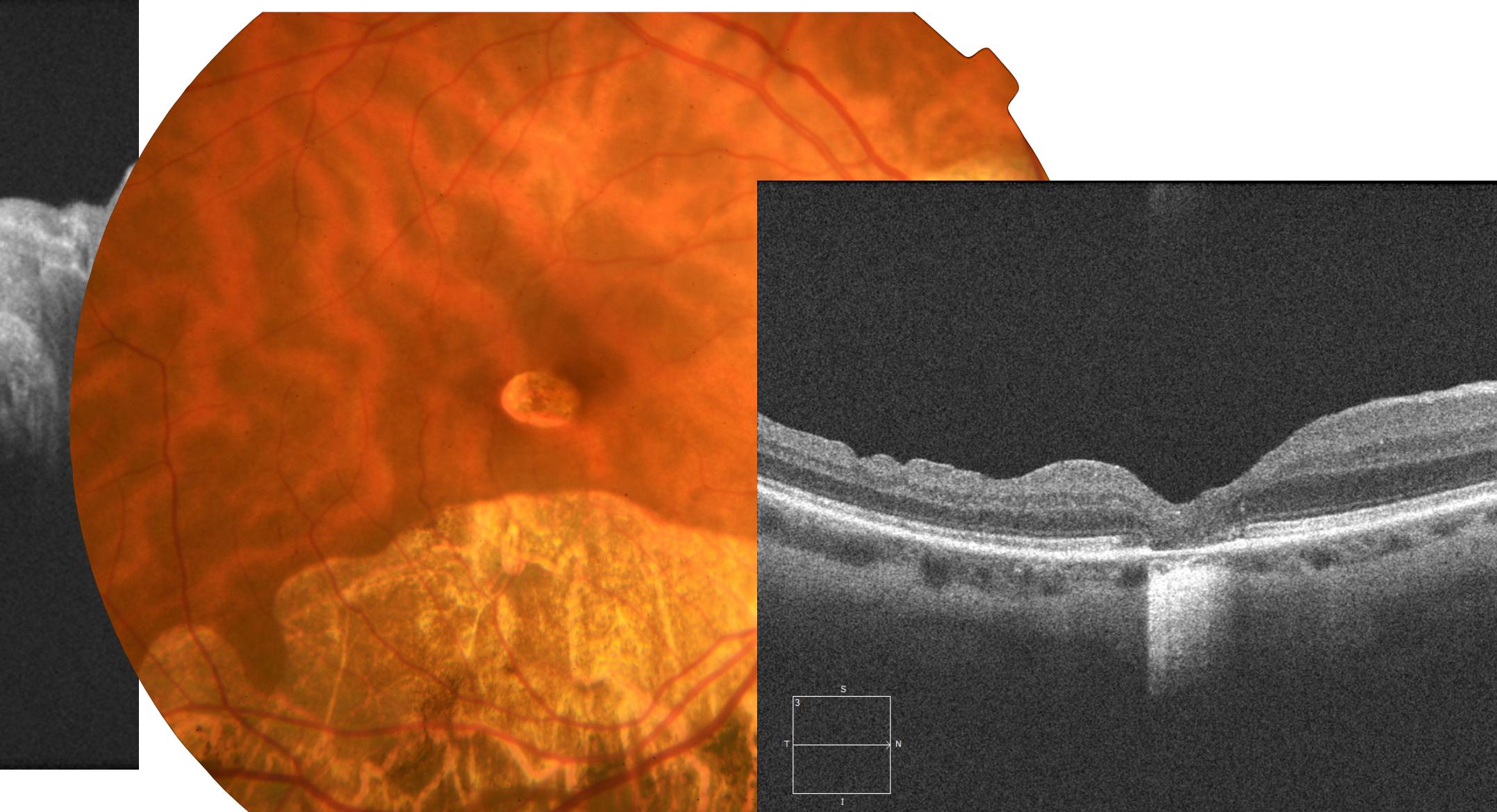
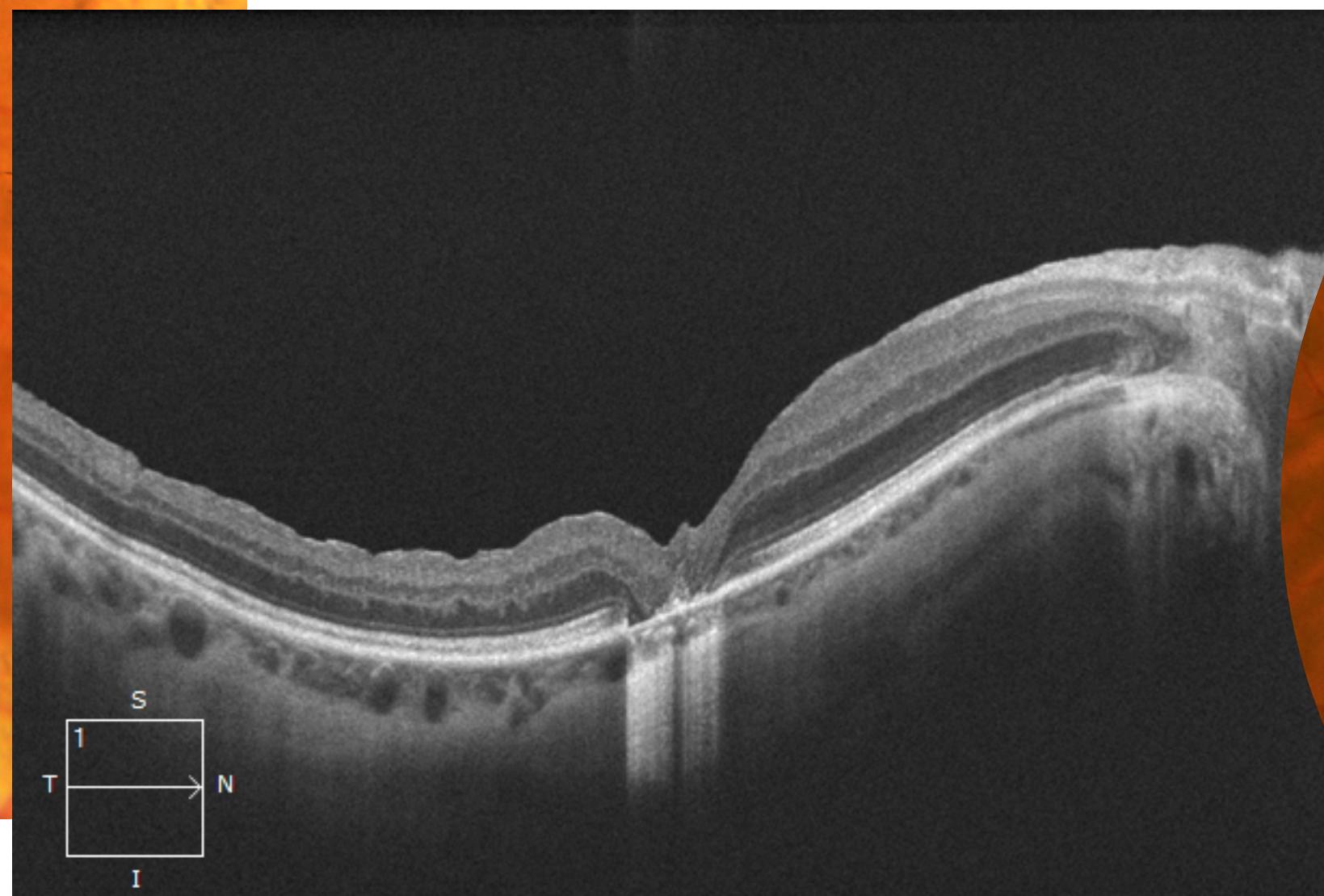
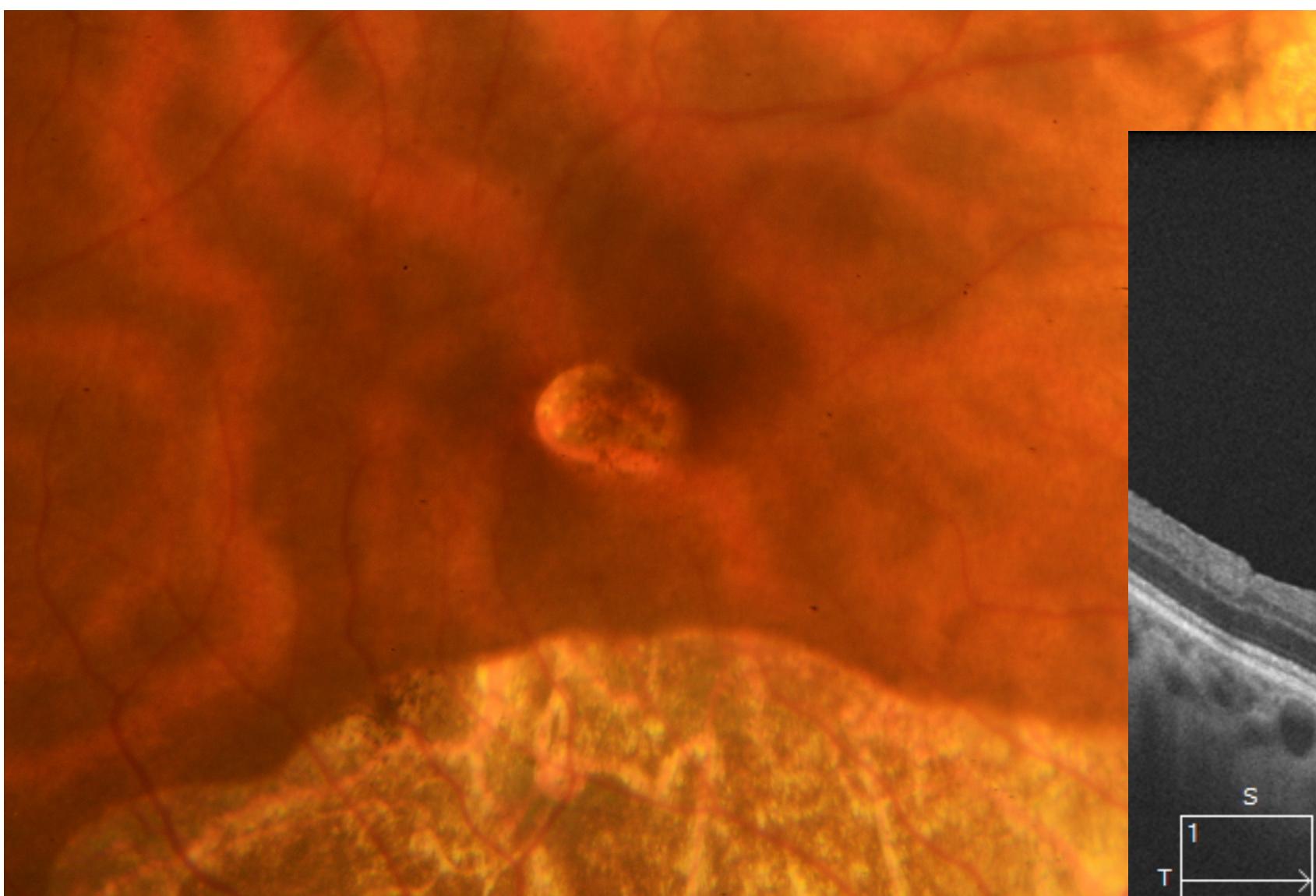
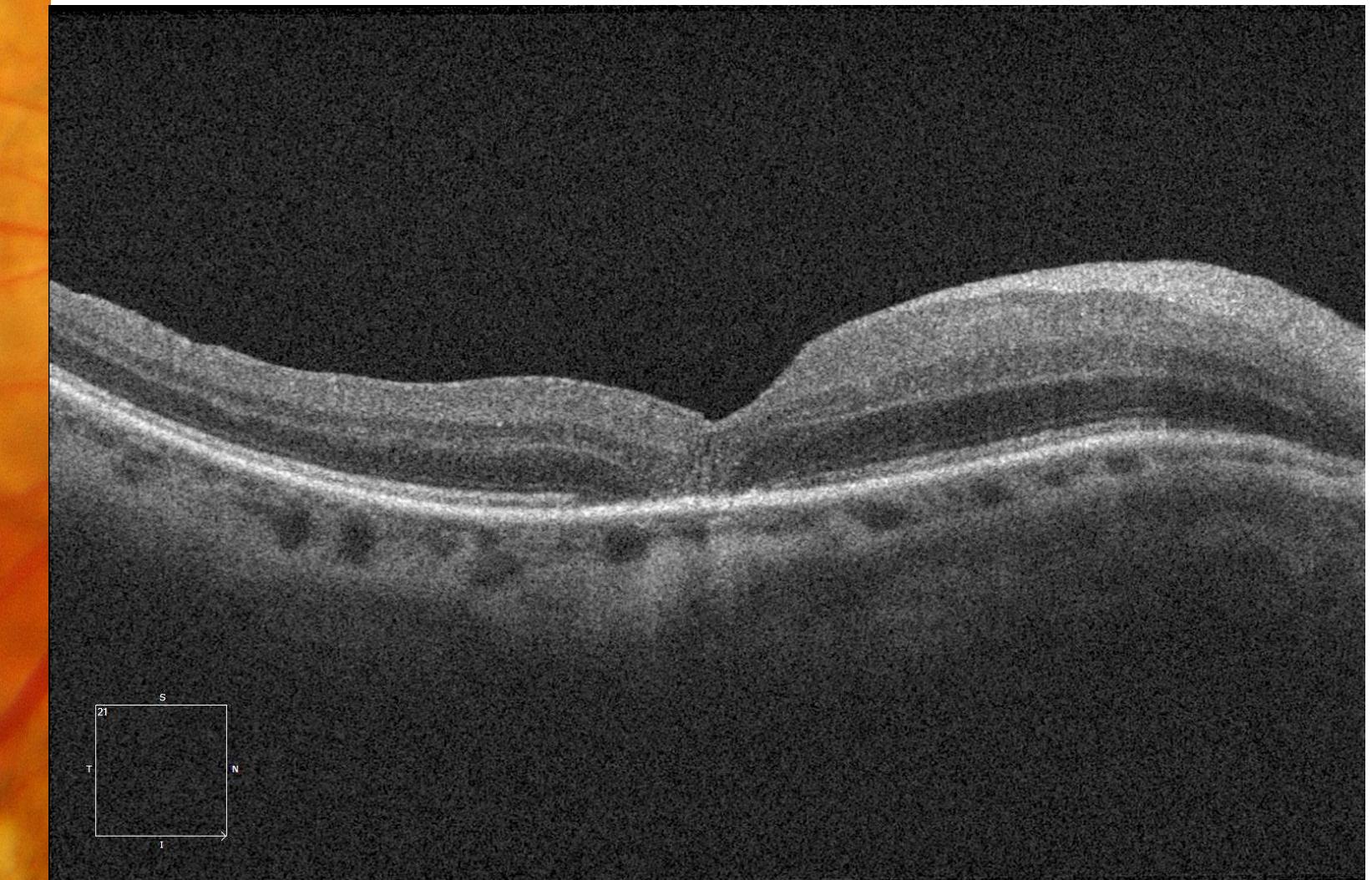
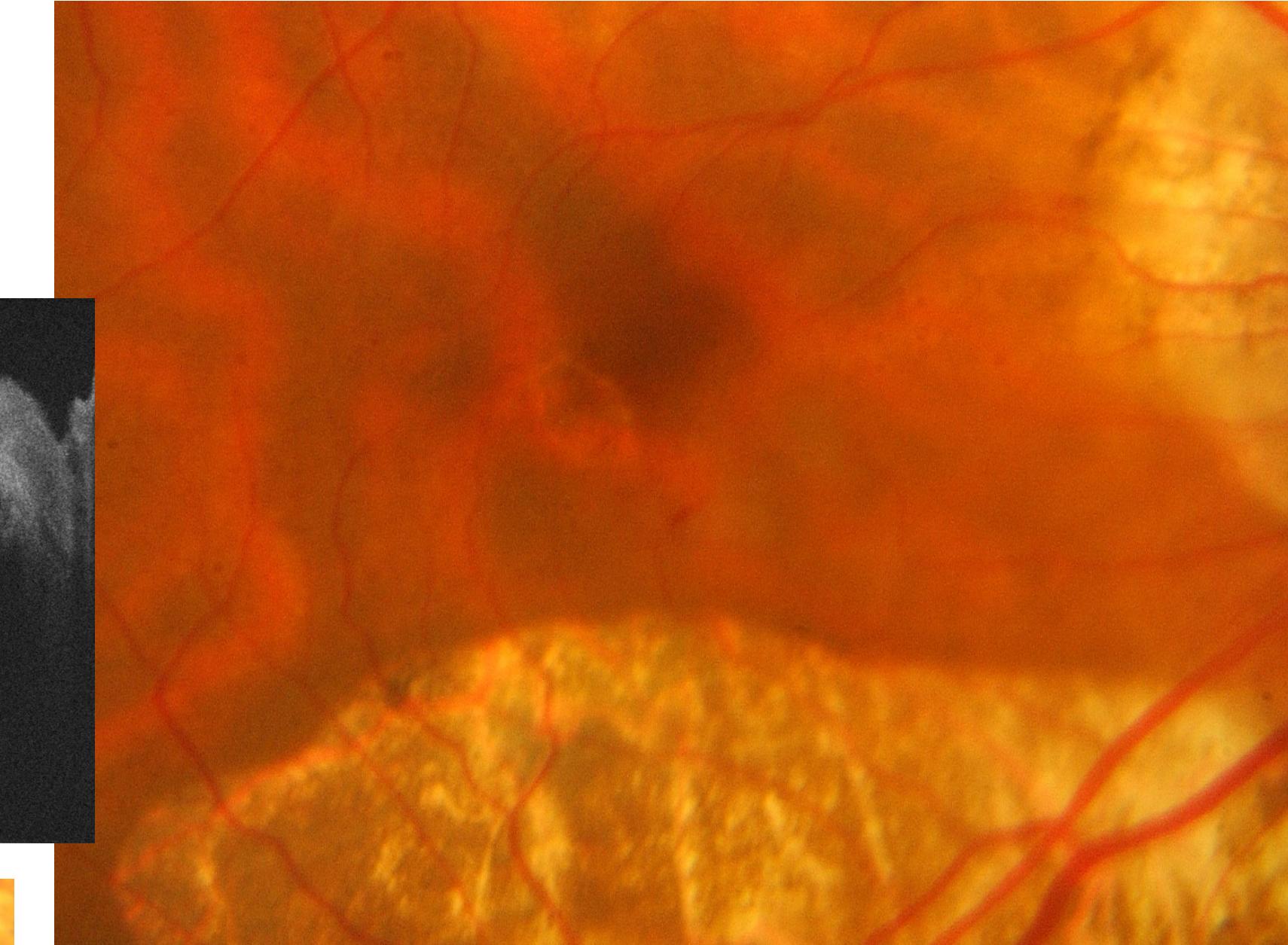
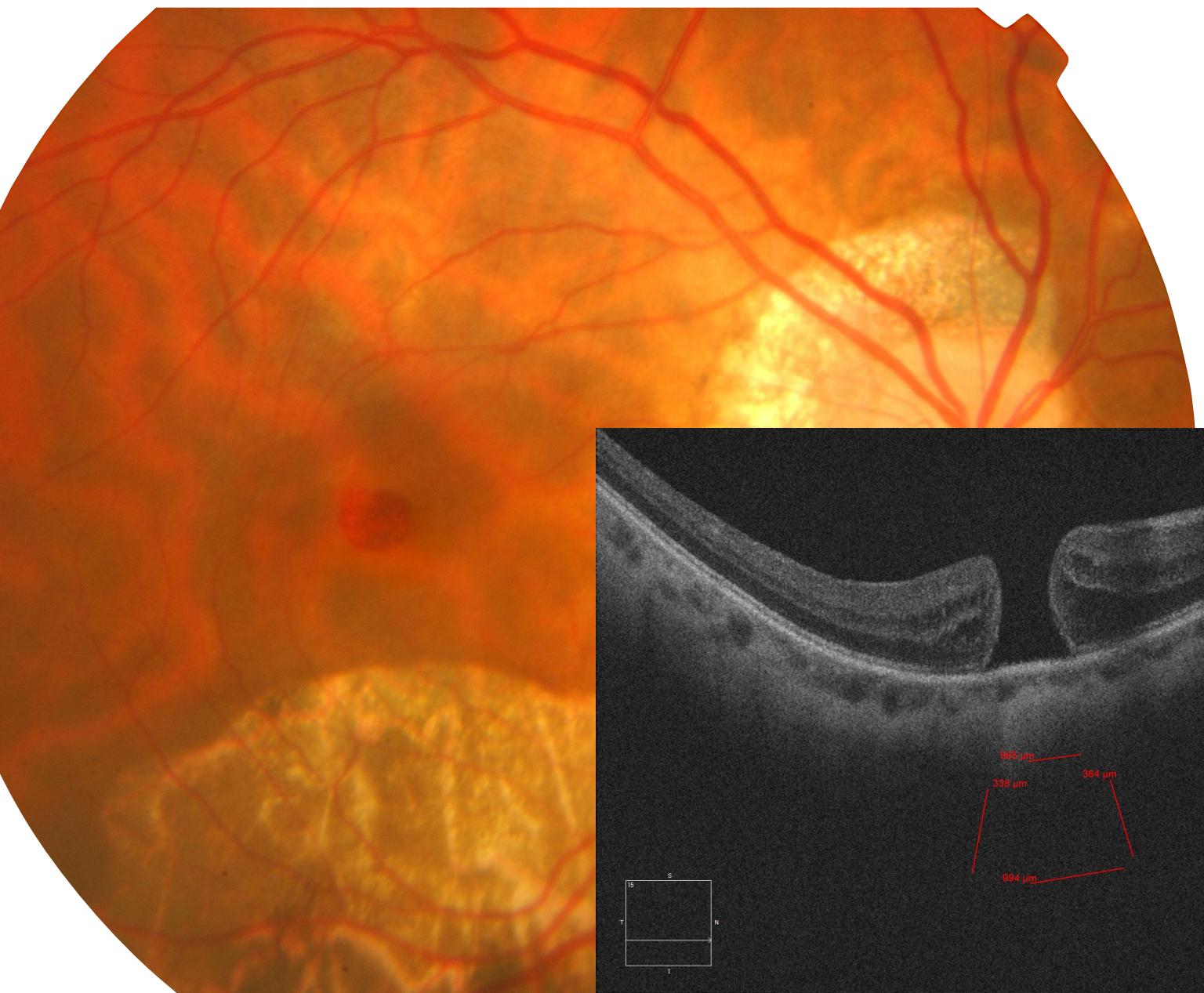
Mateo, C., & Burés-Jelstrup, A. (2016). MACULAR BUCKLING WITH ANDO PLOMBE MAY INCREASE CHOROIDAL THICKNESS AND MIMIC SEROUS RETINAL DETACHMENT SEEN IN THE TILTED DISK SYNDROME. *Retinal Cases & Brief Reports*, 10(4), 327–330

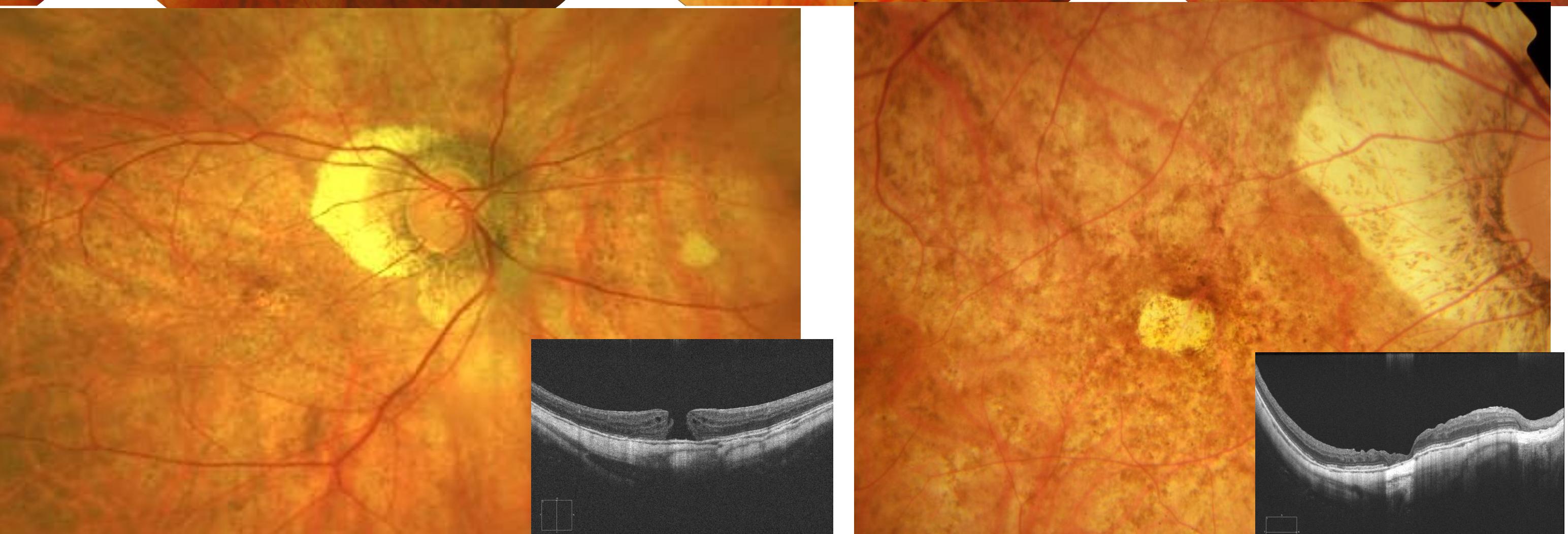
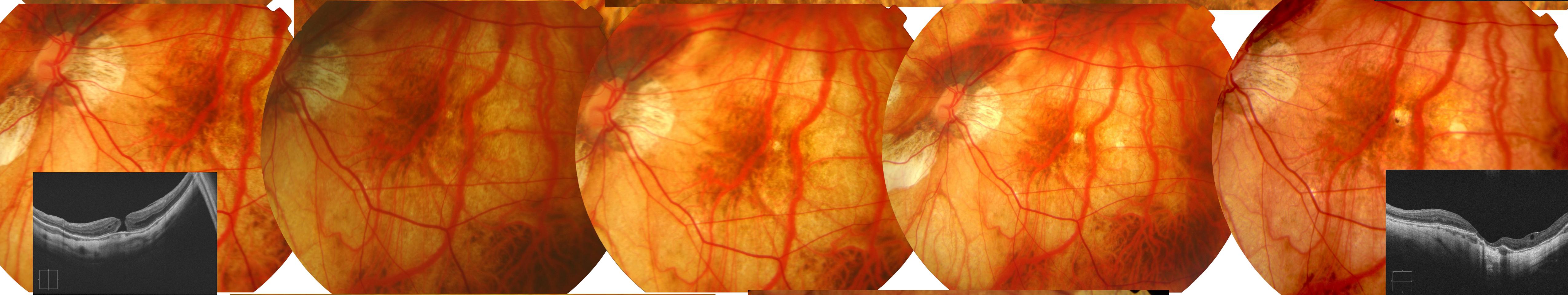
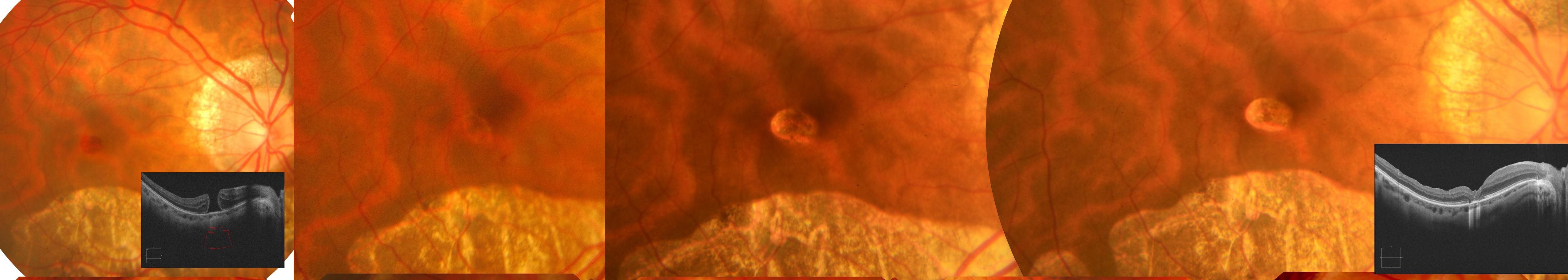
Malpositioning of the Mac Buckle

Hyperopic shift

May be an issue in pseudophakic eyes

ILM inverted Flap may induce RPE changes(?)





SUMMARY

Macular Buckle really relax the retina in the area of the staph inverting forces to maintain the retina attached

Decreasing or inverting the staphyloma height
Counteracting the inward forces related to the stretched retinal arteries

Surgical technique although requires a learning curve, is not complex



“Alexander The Great” would say....

It seems clearRD and MH in high Myopia.....



Macular Buckle PRO