RETINAL DETACHMENT

Acknowledgement

- Photographs in this presentation are courtesy of Dr.Freund. K. Bailey (The Retinal Atlas,2nd Ed.) and
  Dr.Brad Bowling (Kanski's Clinical Ophthalmology, 8thEd.)

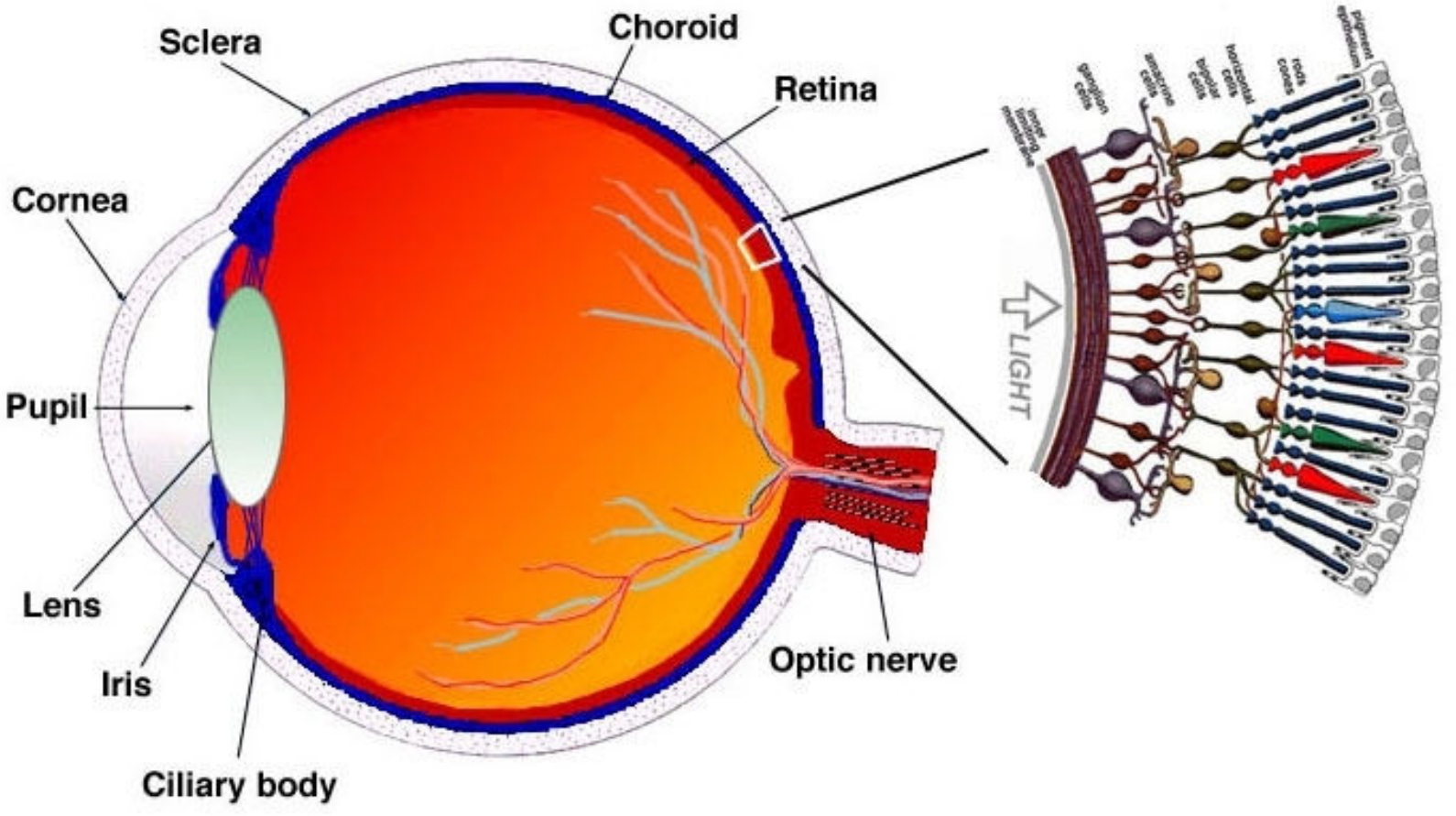
Learning Objectives

At the end of the class, students shall be able to

- Define and classify the various types of retinal detachments (R.D.)
- Understand the pathophysiology and signs and symptoms of retinal detachments
- Have a basic understanding of the management of various types of retinal detachments

What is the retina?

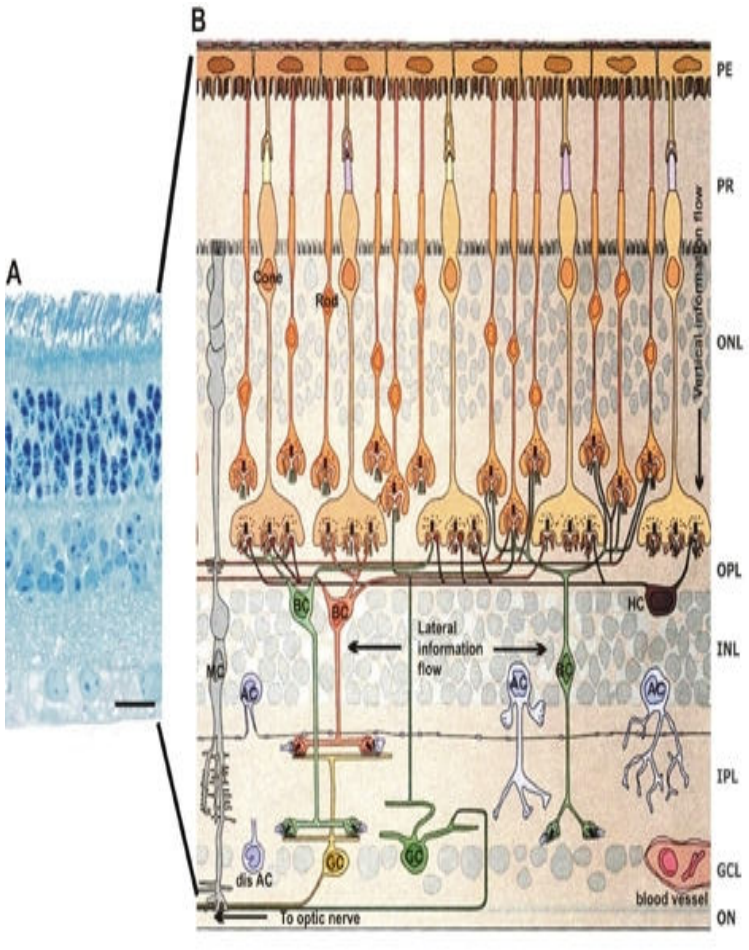
- Innermost coat of the eyeball.
- Thin, delicate, transparent membrane.
- Externally related to the choroid & sclera.
- Thickness
  - Near optic disc – 0.56 mm
  - Equator – 0.18 to 0.2 mm
  - Ora-serrata – 0.1 mm
  - Thinnest at Fovea.



Normal Fundus

Layers of the retina

1. Retinal Pigment Epithelium
2. Layer of Rods & Cones
3. External Limiting Membrane
4. Outer Nuclear Layer
5. Outer Plexiform Layer
6. Inner Nuclear Layer
7. Inner Plexiform Layer
8. Ganglion Cell Layer
9. Nerve Fibre Layer
10. Internal Limiting Membrane



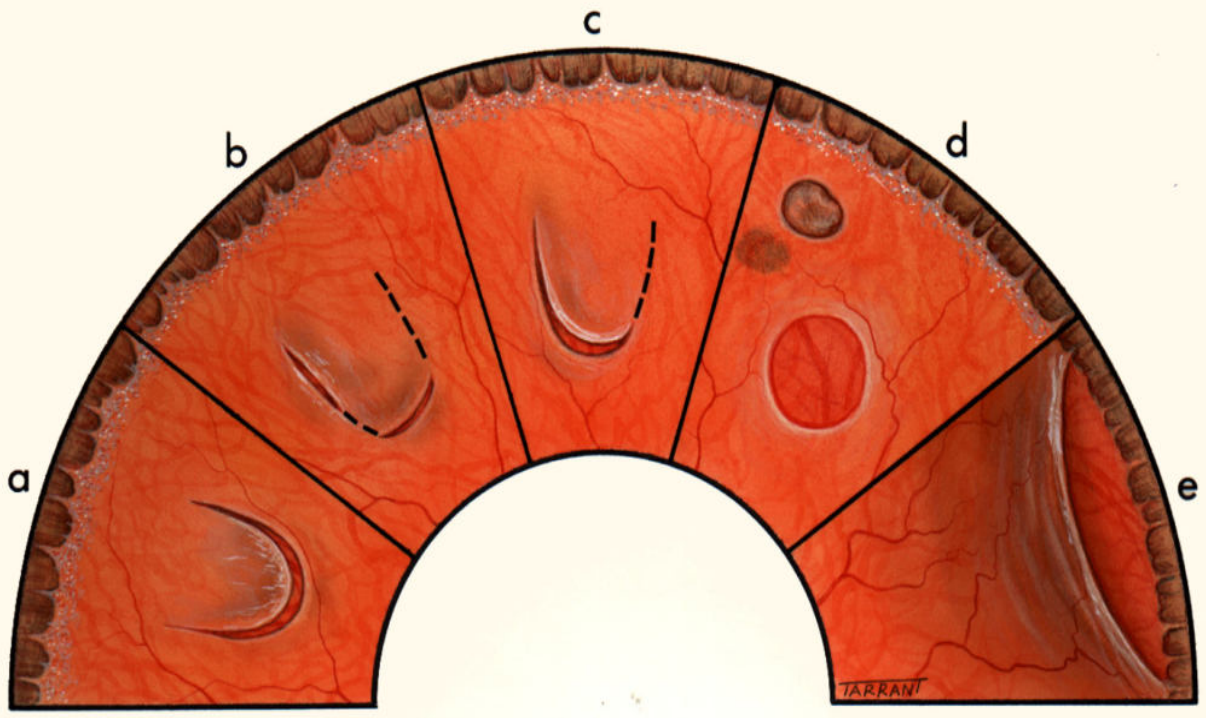
RETINAL DETACHMENT (RD)

1. Definitions and classifications
   - Retinal breaks
   - Retinal detachment

Definition and classification

- Break - full-thickness defect in sensory retina
- Hole - caused by chronic retinal atrophy
- Tear - caused by dynamic vitreoretinal traction

Morphology of tears



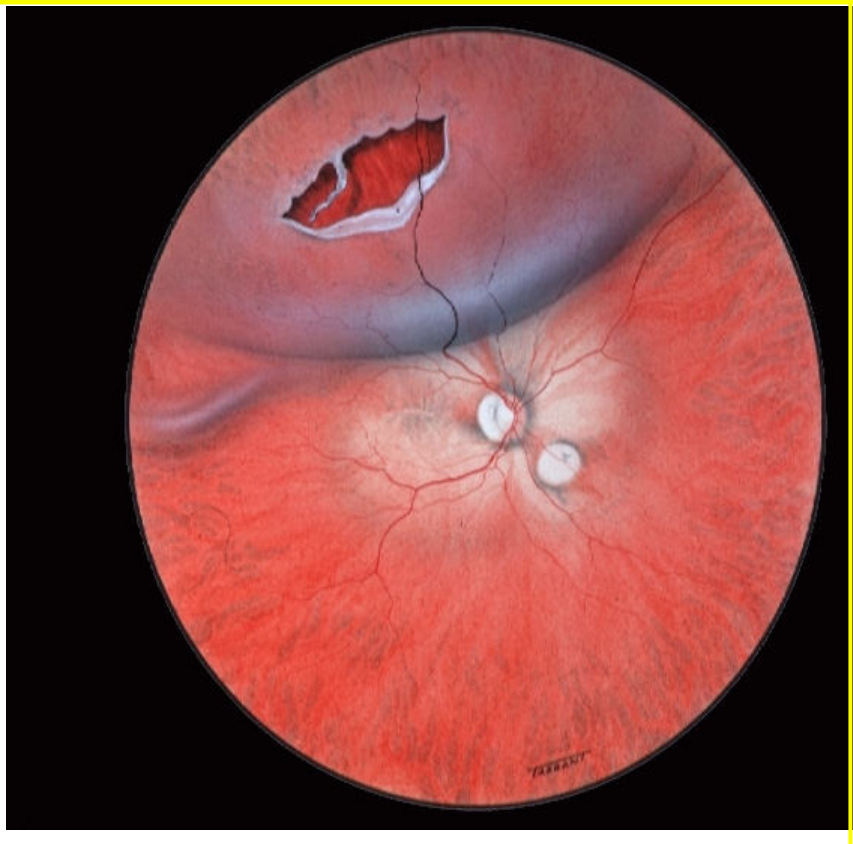
a. Complete U-tear
b. Linear
c. Incomplete L-shaped
d. Operculated
e. Dialysis

DEFINITION

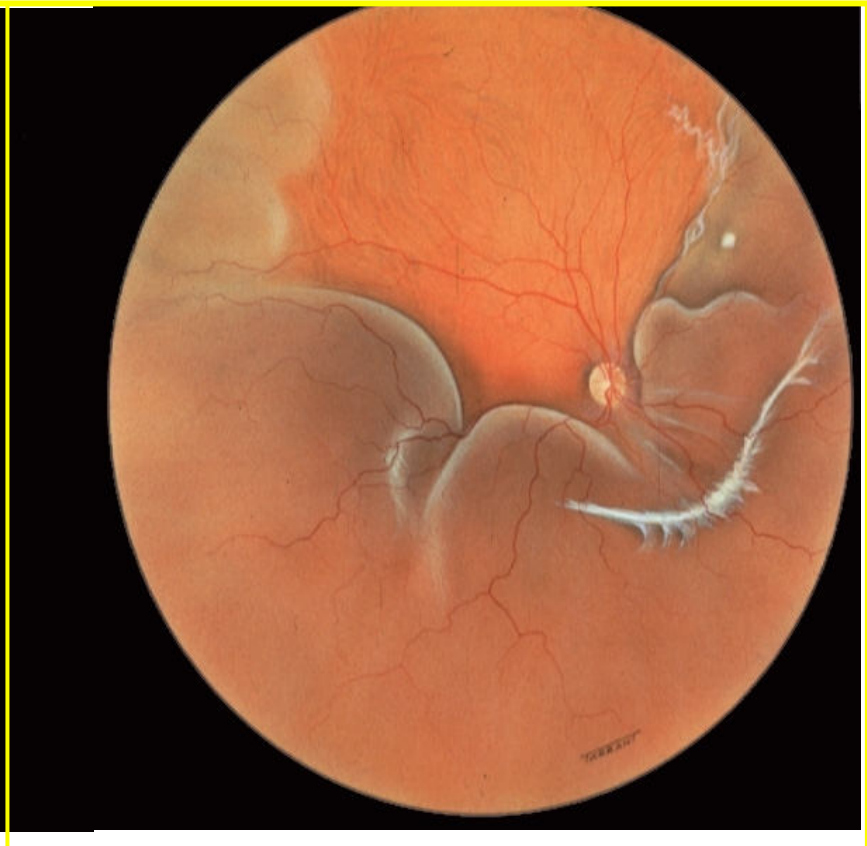
- RETINAL DETACHMENT (R.D.) is defined as the separation of neurosensory retina (NSR) from retinal pigment epithelium (RPE) caused by breakdown of forces that attach the NSR to RPE resulting in accumulation of sub retinal fluid (SRF) in the potential space between the NSR and RPE.

Retinal detachment (RD)

Separation of sensory retina from RPE by subretinal fluid (SRF)



Rhegmatogenous - caused by a retinal break



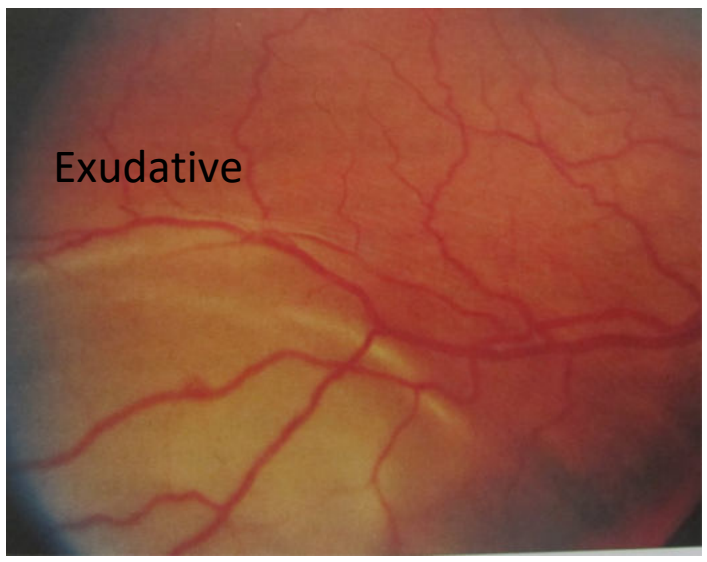
Non-rhegmatogenous - tractional or exudative

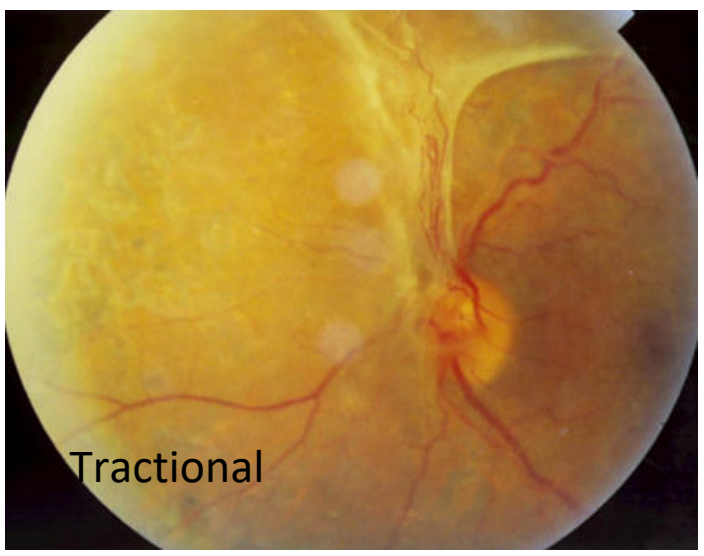
Classification

- Clinico-etiologically – Three types of retinal detachment

1. Rhegmatogenous(or primary) retinal detachment
2. Tractional retinal detachment
3. Exudative retinal detachment

Classification-





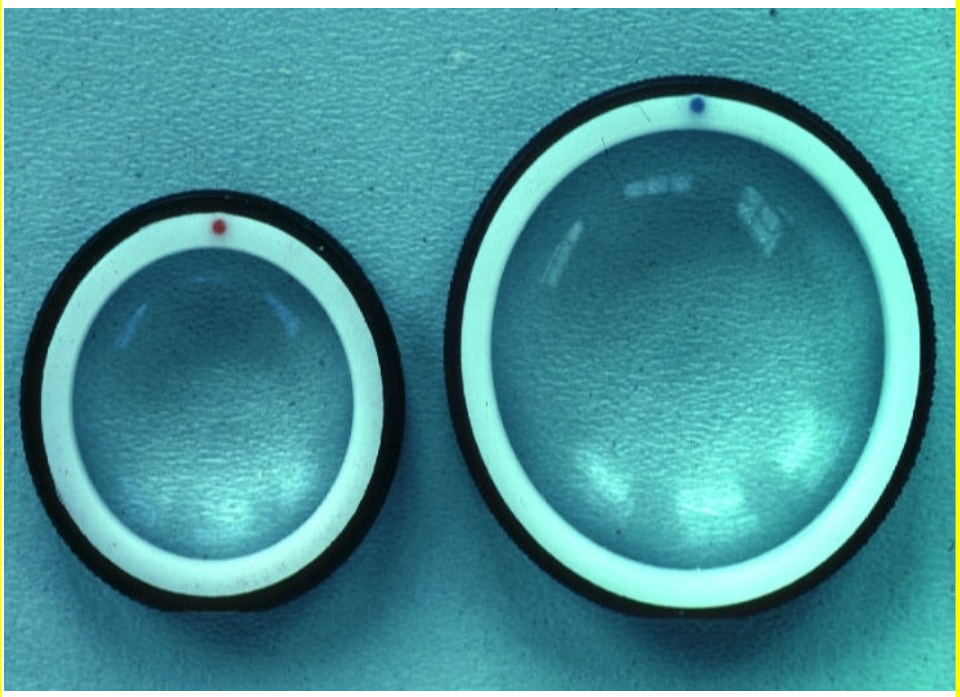
Predisposing factors for RD

- Myopia
- Aphakia (& Pseudophakia)
- Trauma
- Retinal Degenerations
- PVD

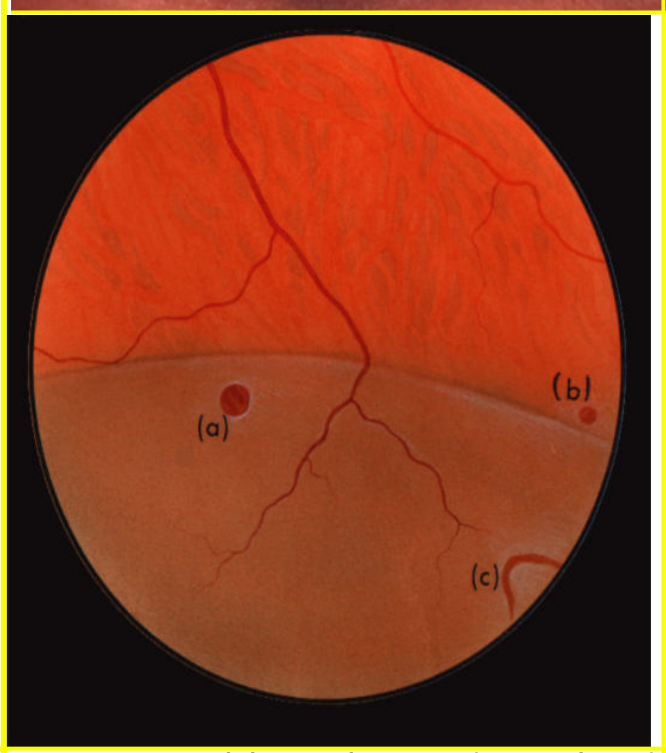
Rhegmatogenous retinal detachment

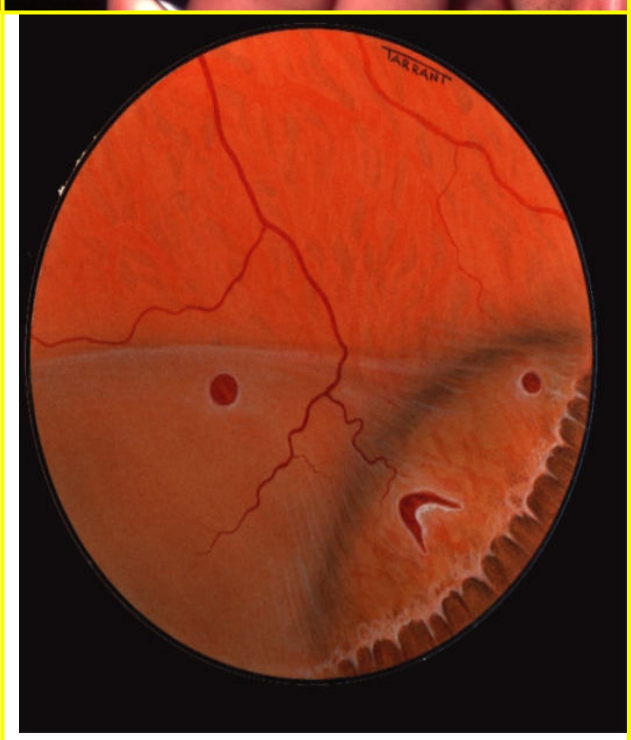
- Is usually associated with a retinal break (hole/tear)
- Sub retinal fluid(SRF) seeps and separates the neurosensory retina from the retinal pigment epithelium(RPE)

Indirect ophthalmoscopy

Condensing lenses	Technique
	
• The higher the power, the less the magnification, the shorter the working distance , greater the field of view	• Keep lens parallel to patient's iris plane • Avoid tendency to move towards patient • Ask the patient to move eyes and head into optimal positions for examination

Scleral indentation



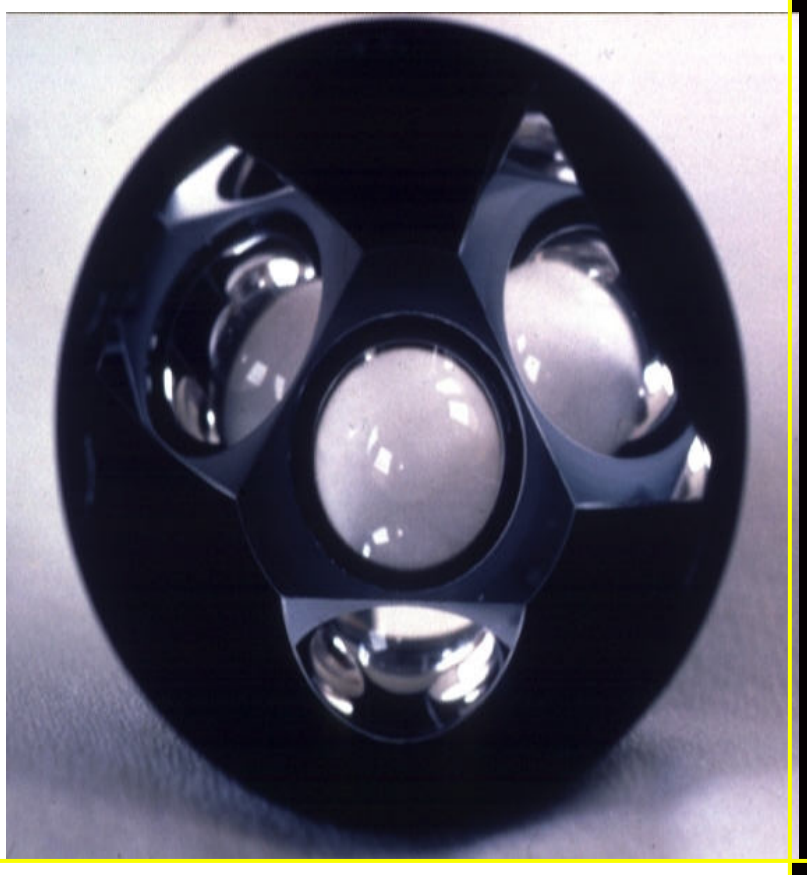


Retinal breaks in detached retina without indentation

Enhanced visualization of breaks with indentation

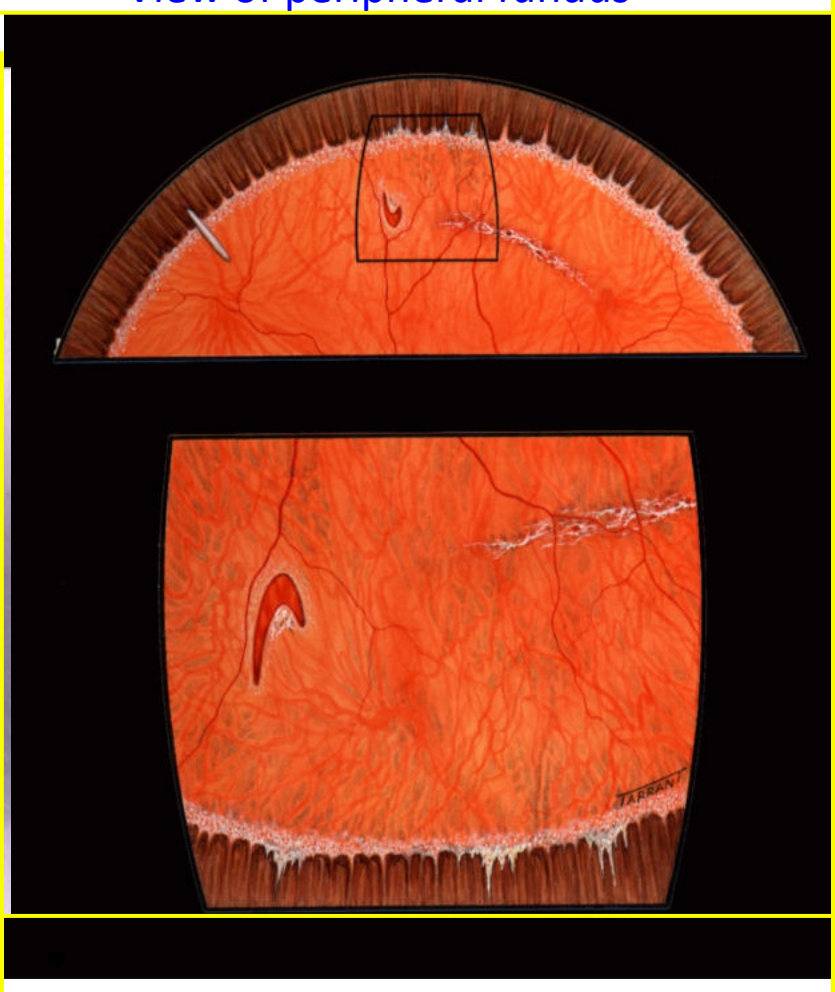
Slitlamp biomicroscopy

Goldmann triple-mirror lens



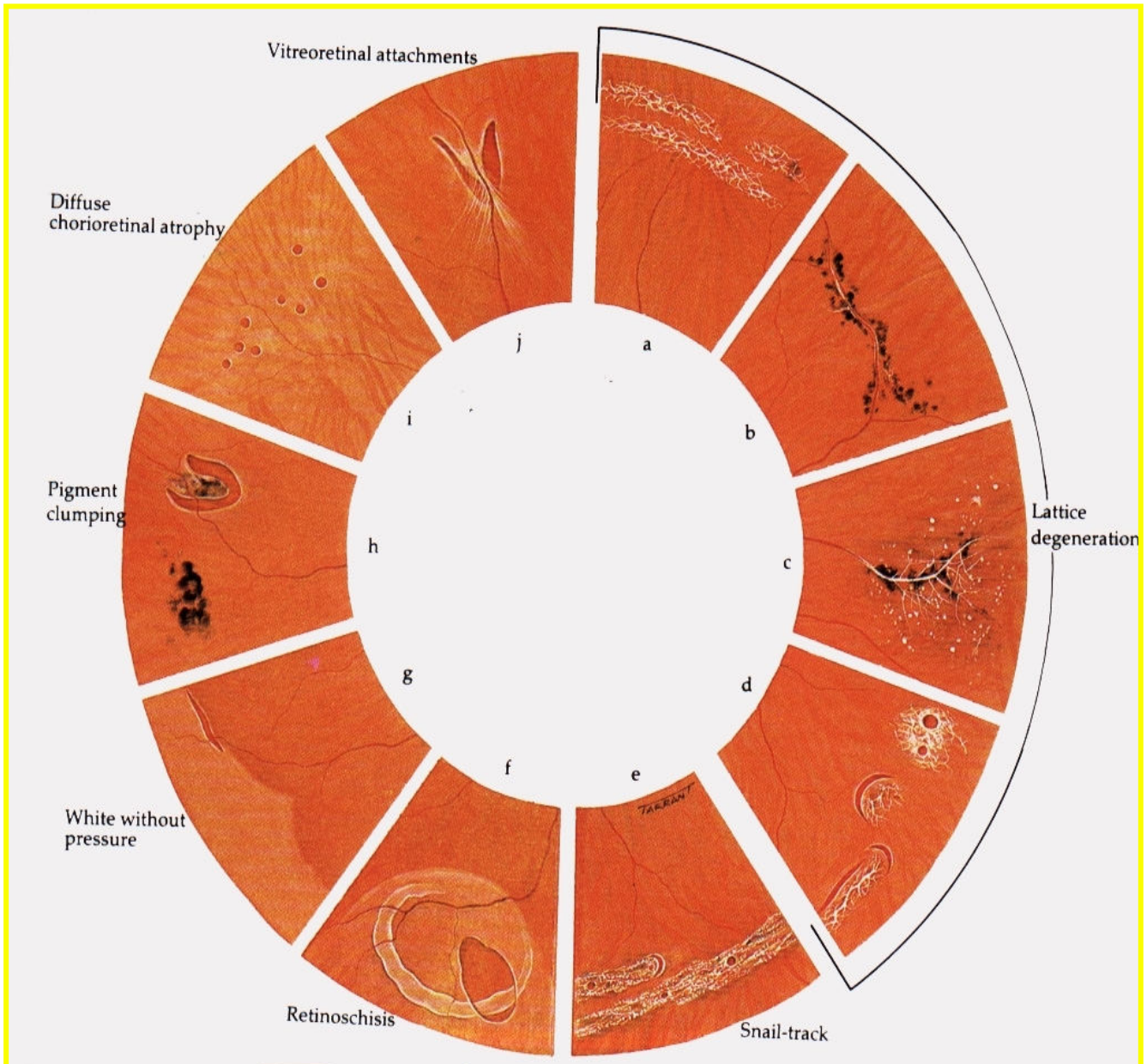
- Equatorial mirror (largest and oblong) - from 30 to equator
- Peripheral mirror (square) - ~~from equator to ora serrata~~
- Gonioscopic (smallest)

View of peripheral fundus



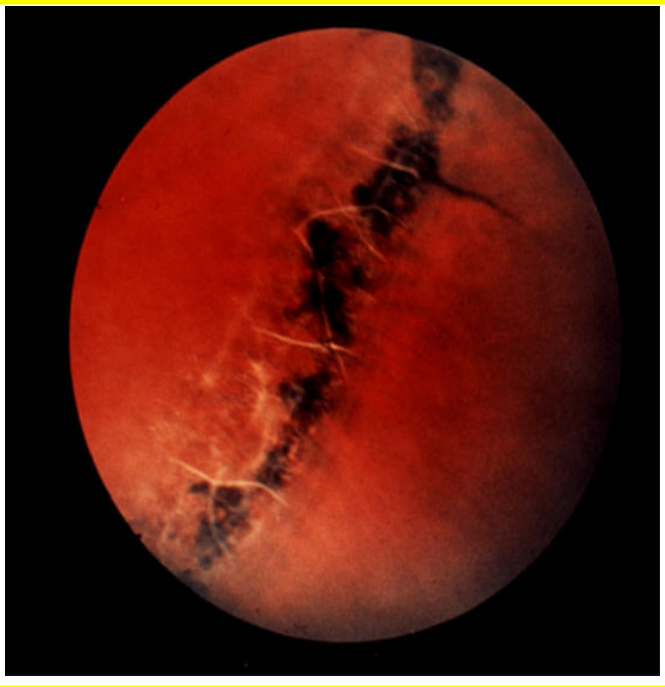
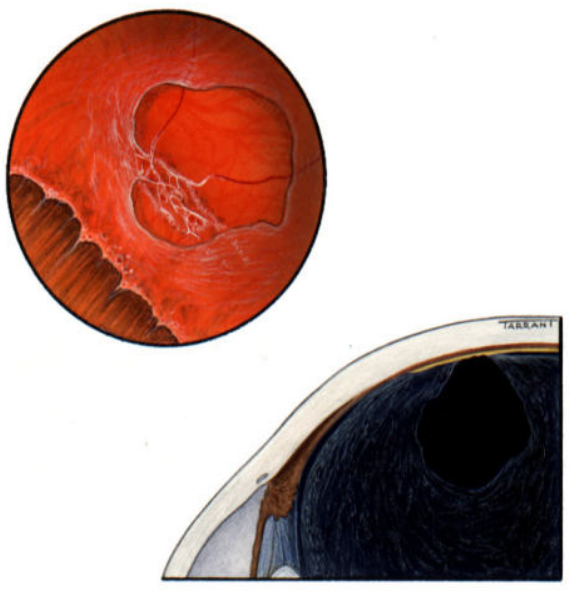
- Image is upside down

Predisposing peripheral degenerations

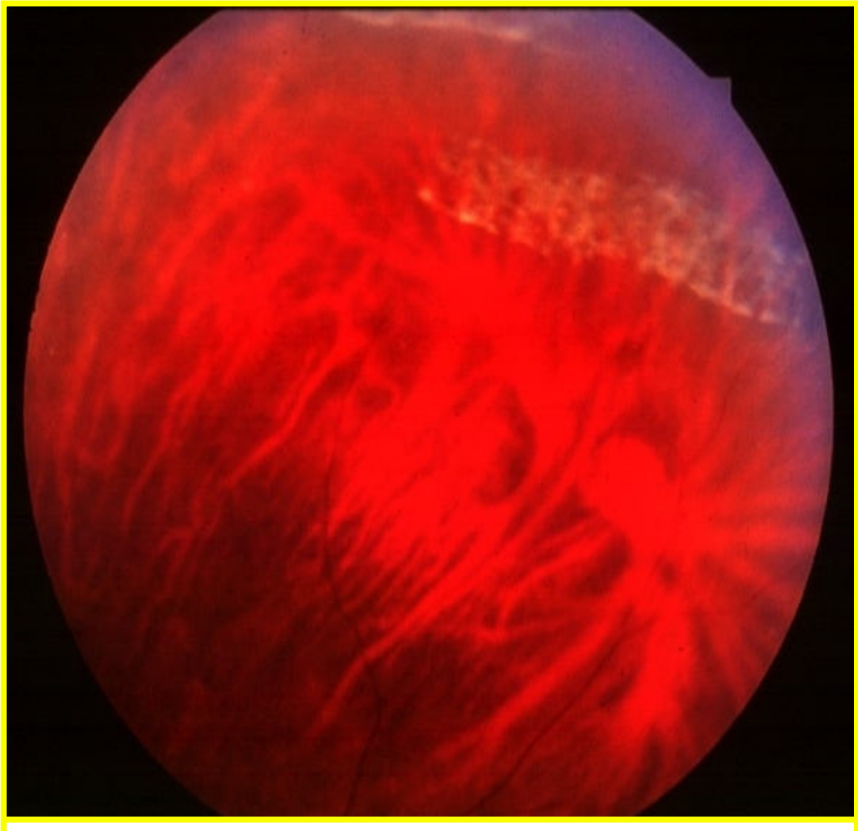


Typical lattice degeneration

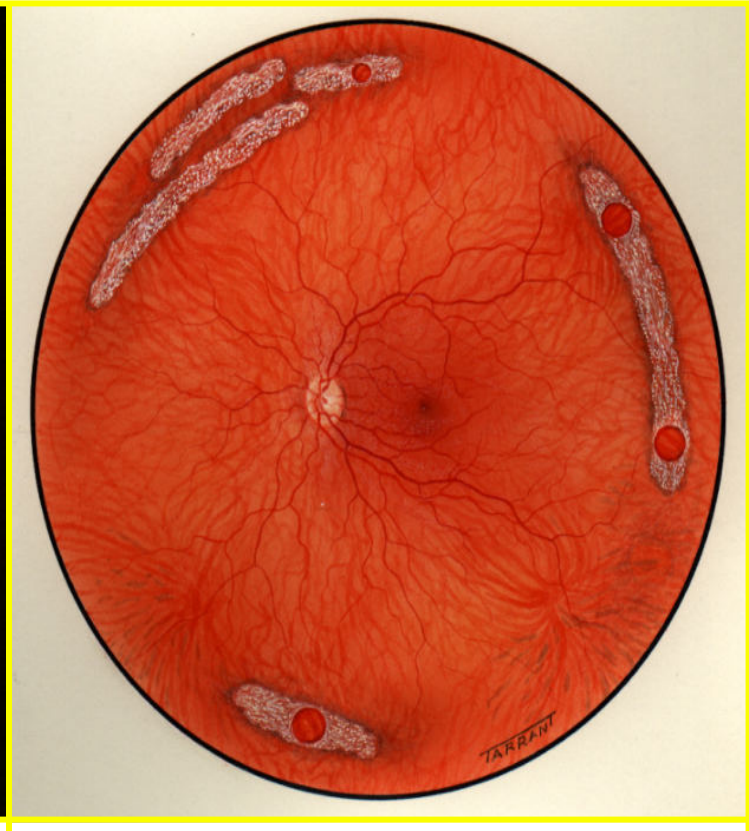
- Present in about 8% of general population
- Present in about 40% of eyes with RD

Retina	Vitreous
	
• Spindle-shaped islands of retinal thinning • Network of white lines within islands • Variable associated RPE changes • Small round holes within lesions are common	• Overlying vitreous liquefaction • Exaggerated attachments around margin of lesion

Snail track degeneration



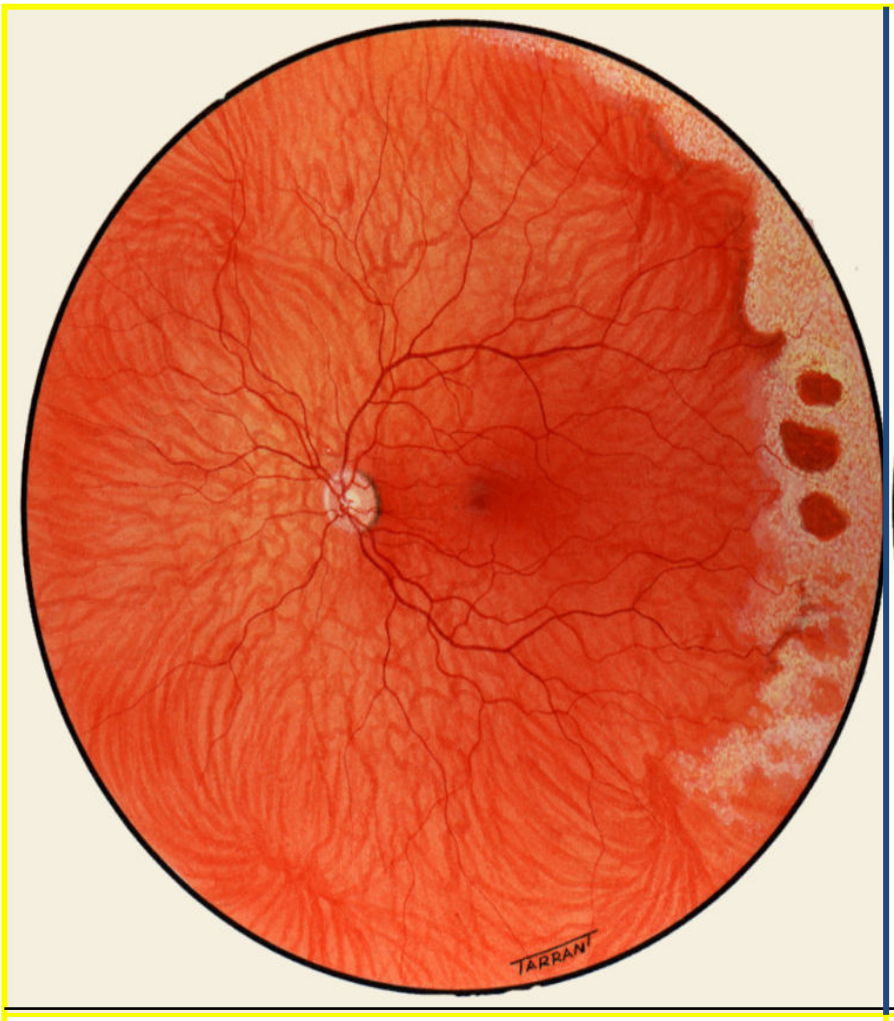
Sharply demarcated, frost-like bands which are longer than lattice



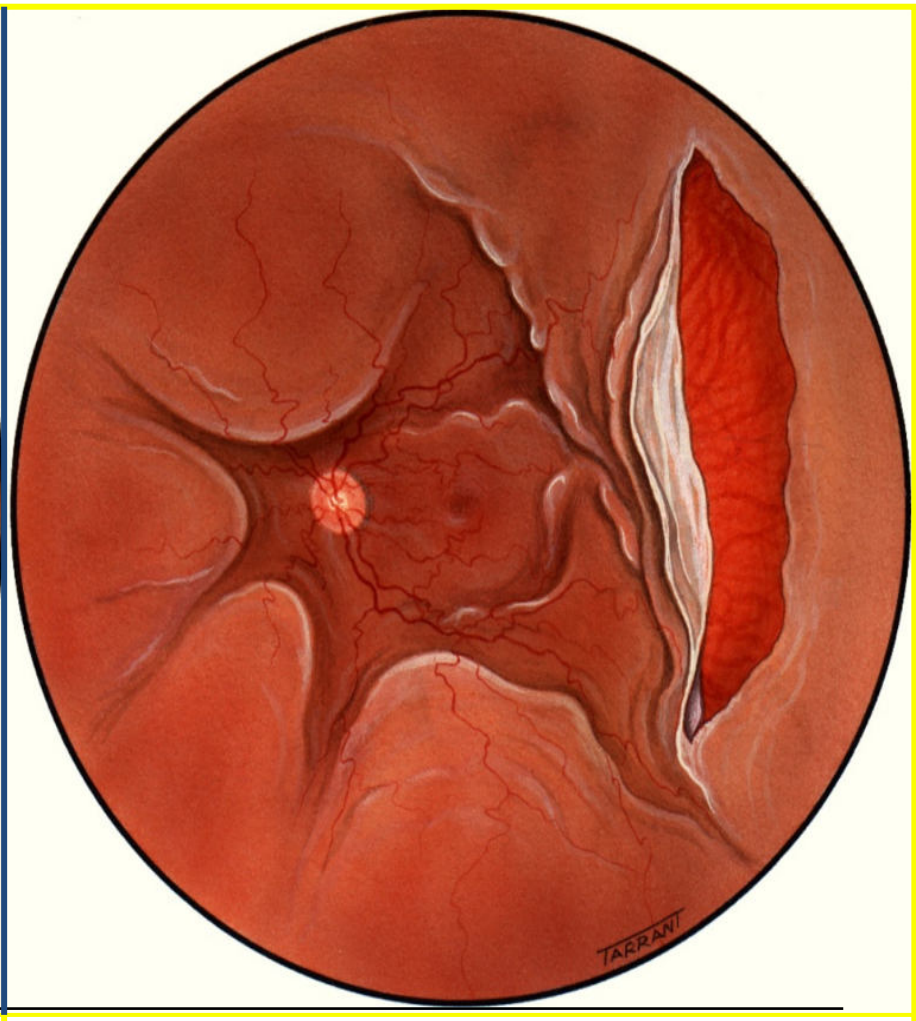
Large round holes which carry high risk of RD

Indications for prophylaxis - presence of holes

White-without-pressure



Translucent grey appearance of retina



Occasional giant tear formation along posterior margin of lesion

Indications for prophylaxis - giant tear in other eye

Why is normal retina attached?

- Vitreous tamponade
- Acid mucopolysaccharides (Bio glue)
- Hydrostatic pressure(Less pressure in the sub retinal space)
- RPE Pump

Pathogenesis

- Retinal breaks are due to

  dynamic vitreoretinal traction

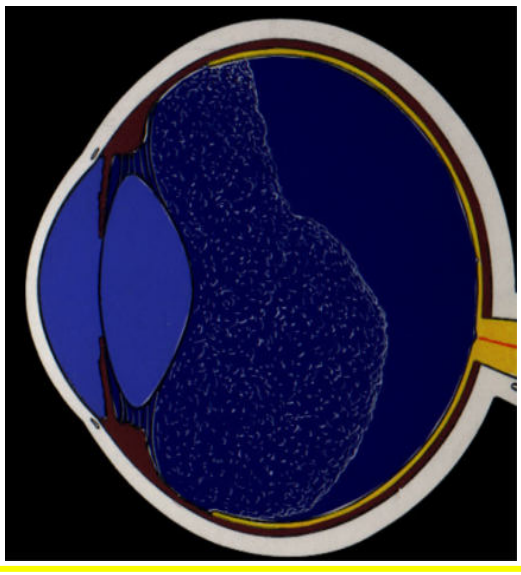
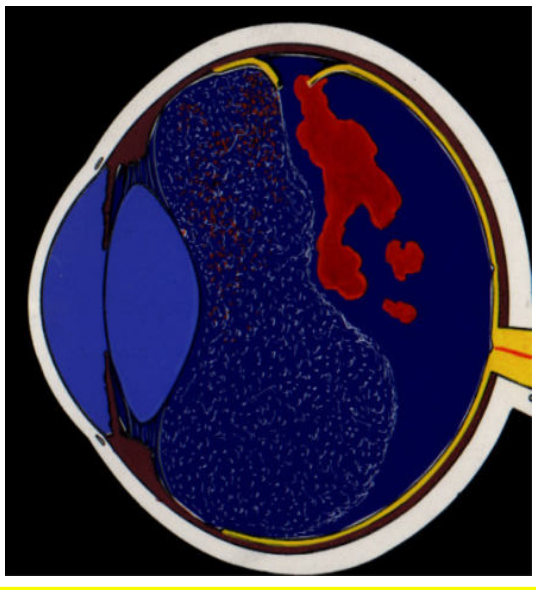
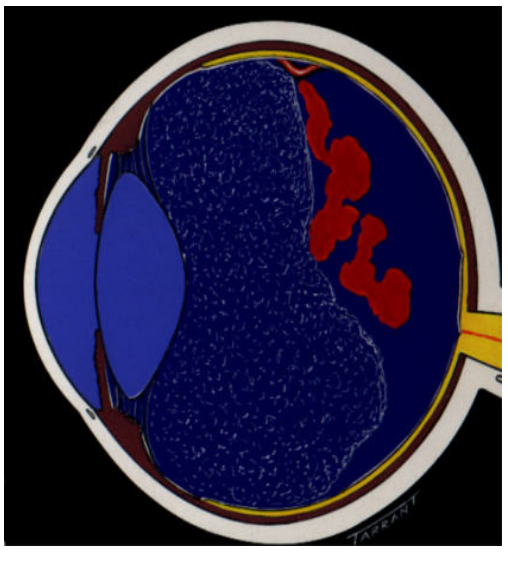
  and

  predisposing retinal degeneration
- Degenerated fluid vitreous seeps through retinal break and collects as SRF between sensory retina and RPE leading to RD

Pathogenesis of rhegmatogenous RD

Two components for retinal break formation

- Acute posterior vitreous detachment (PVD)
- Predisposing peripheral retinal degeneration

Possible sequelae of acute PVD		
		
Uncomplicated PVD (85%)	Retinal tear formation and haemorrhage (10-15%)	Avulsion of retinal vessel & haemorrhage (uncommon)

Clinical features

- Prodromal symptoms

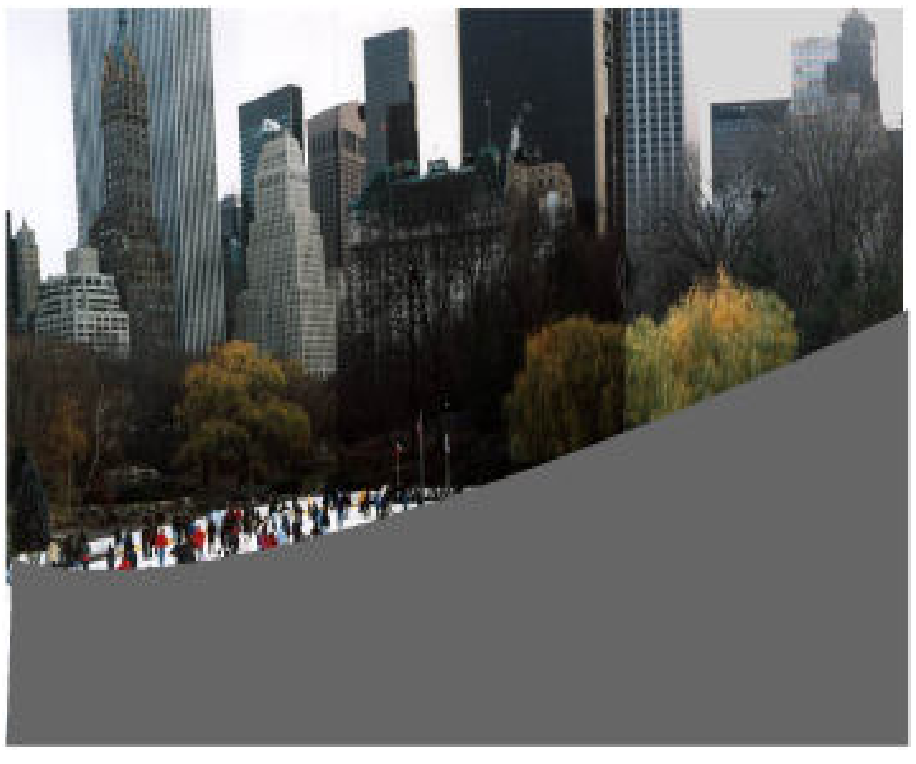
Floaters (dark spots)

Photopsia (flashes of light)

- Symptoms of RD

Loss in the field of vision(Localised and relative progressing to total loss)

Painless loss of vision(usually rapid) with appearance of cloud/veil in front of affected eye



Signs of R.D.

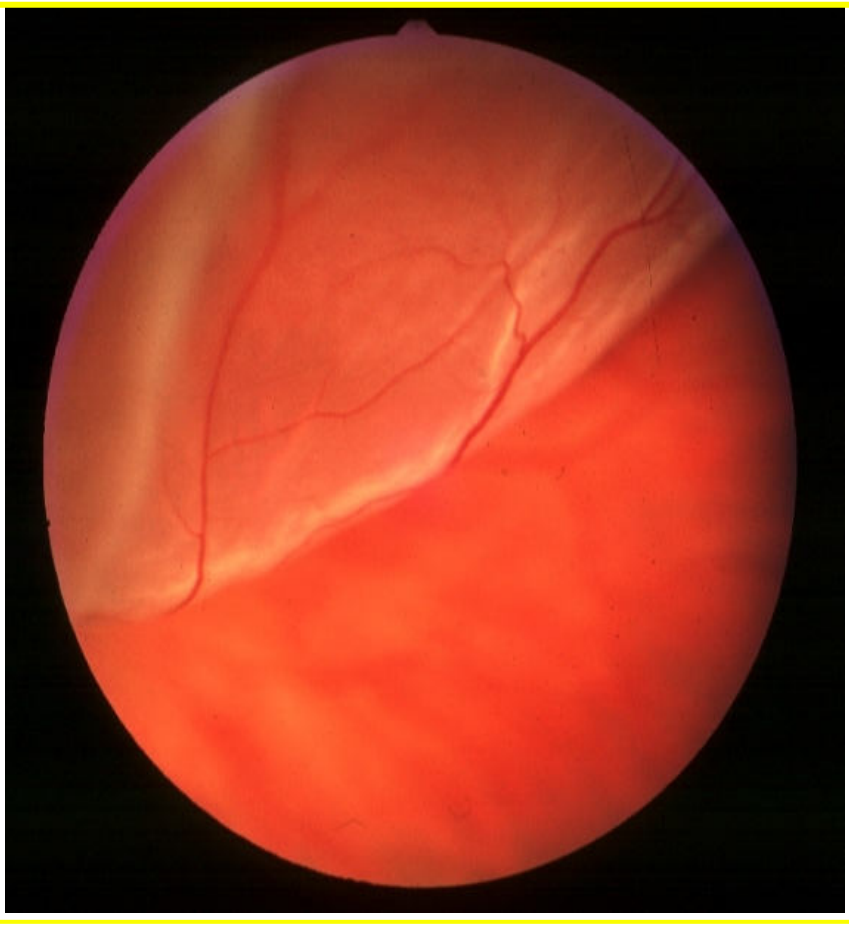
- External examination: Usually normal
- Intra ocular pressure: Slightly lower or normal
- Pupils: Normal reaction or Relative Afferent Pupillary Defect in extensive RD
- Plane mirror examination: Greyish reflex

Signs of R.D.

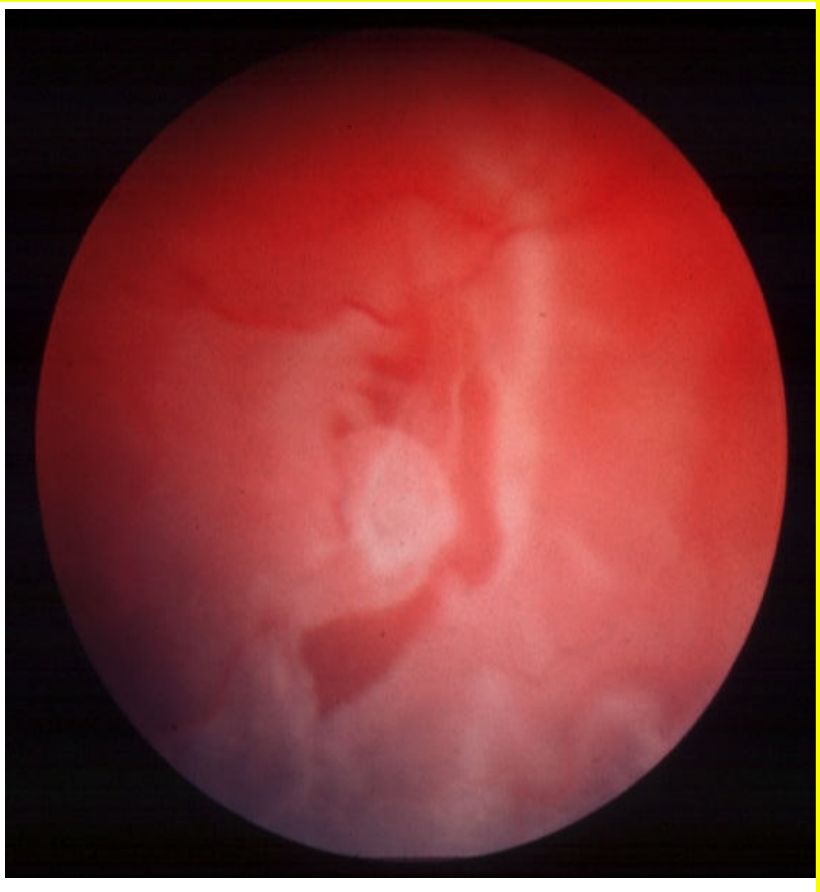
- Ophthalmoscopy: Indirect Ophthalmoscopy with scleral indentation: Tobacco dust(Shafer's sign)
- Retinal breaks
- Convex configuration with folds(corrugations)
- Loss of the choroidal pattern
- Retinal blood vessels - darker than in flat retina

Fresh rhegmatogenous RD - signs

- Annual incidence - 1:10,000 of population
- Eventually bilateral in 10%



- Convex, deep mobile elevation extending to ora serrata
- Slightly opaque with dark blood vessels

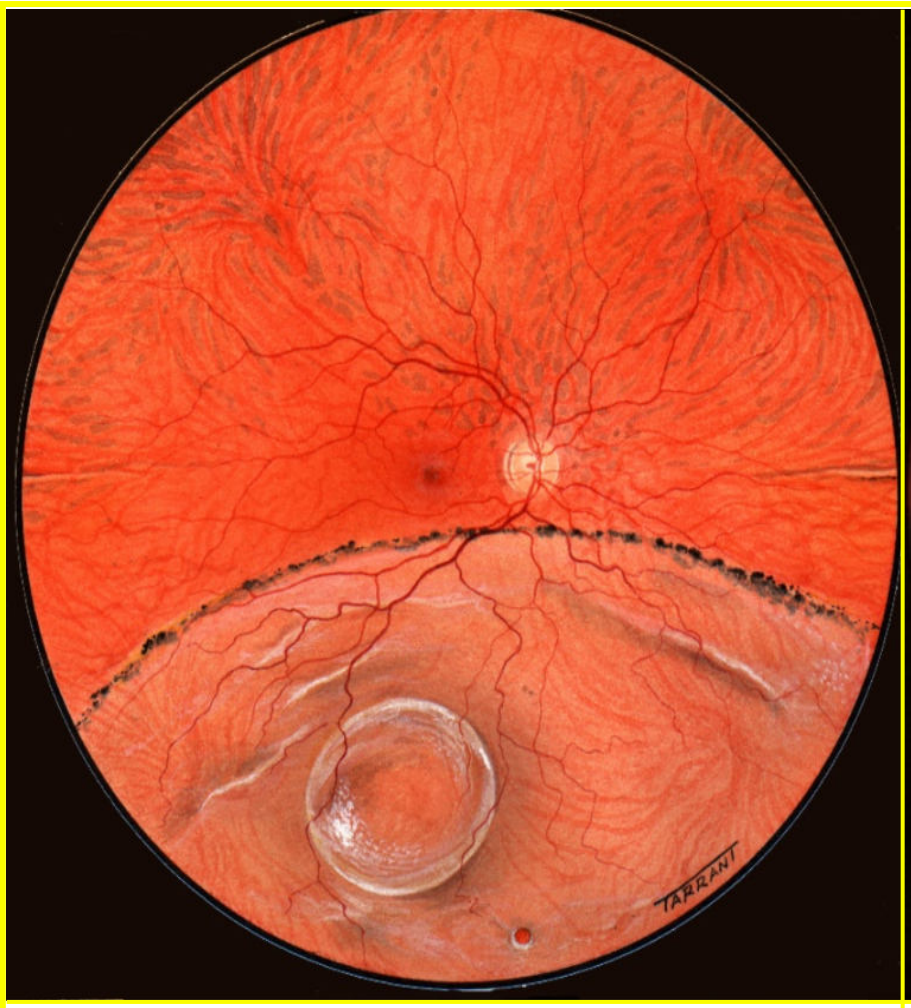


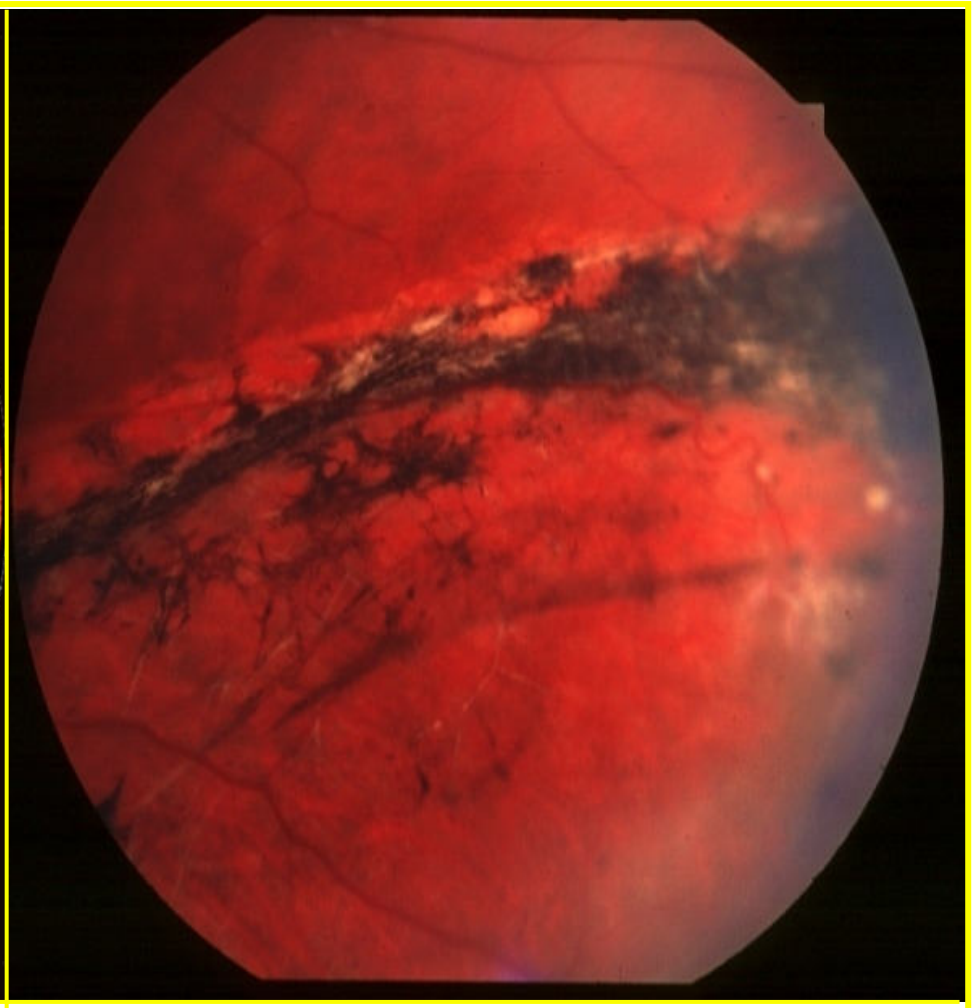
- Loss of choroidal pattern
- Retinal breaks

Signs of old RD

- Retinal thinning (due to atrophy)
- Sub retinal demarcation line/high water mark (due to RPE proliferation)
- Secondary intra retinal cysts

Longstanding rhegmatogenous RD - signs





- Frequently inferior with small holes
- Very thin retina
- Secondary intraretinal cysts

- Demarcation lines (high-water marks)

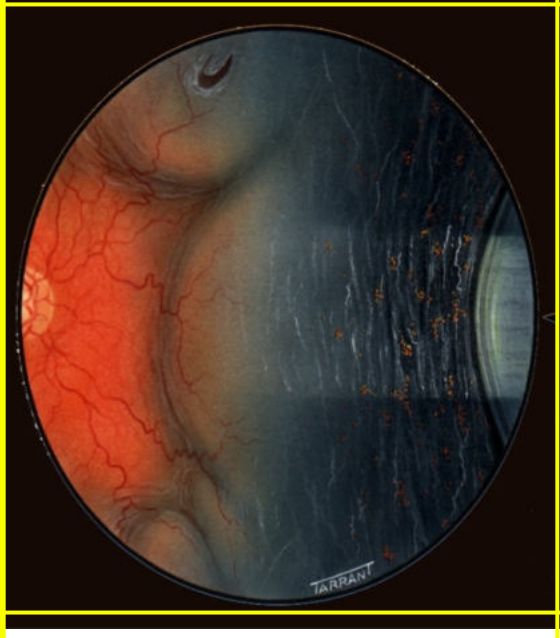
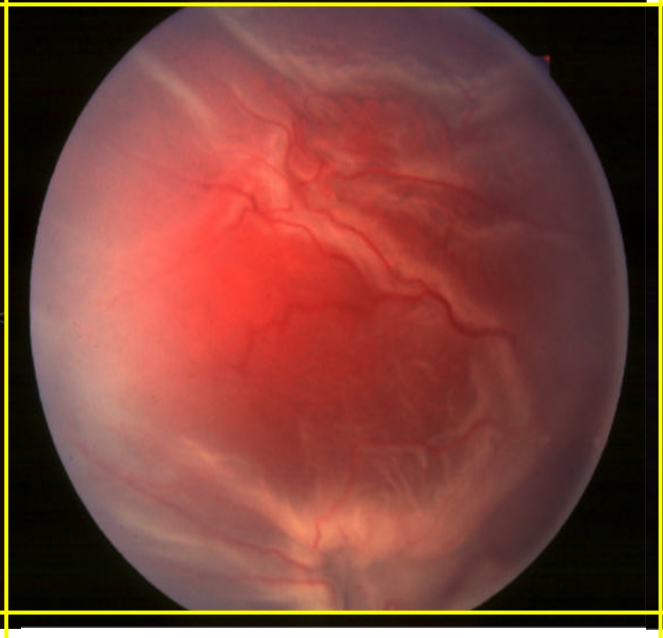
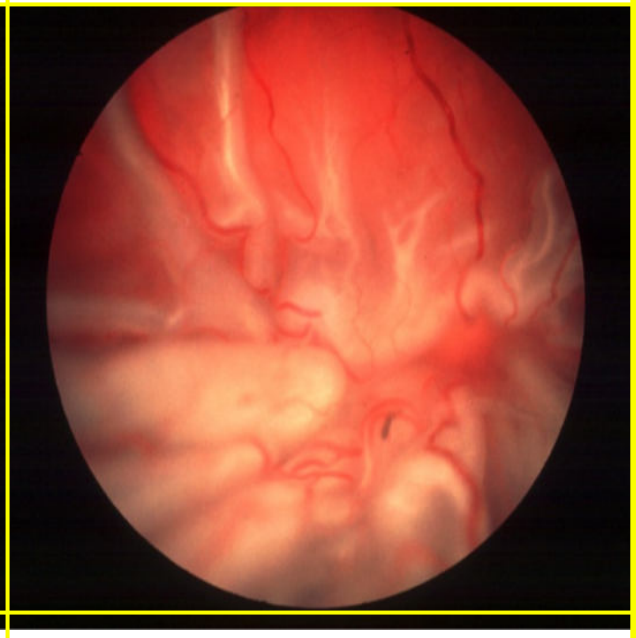
Investigations

- Ultrasonography confirms the diagnosis especially when media is hazy.
- Visual field charting : scotomas (relative/absolute)
- ERG: subnormal or absent

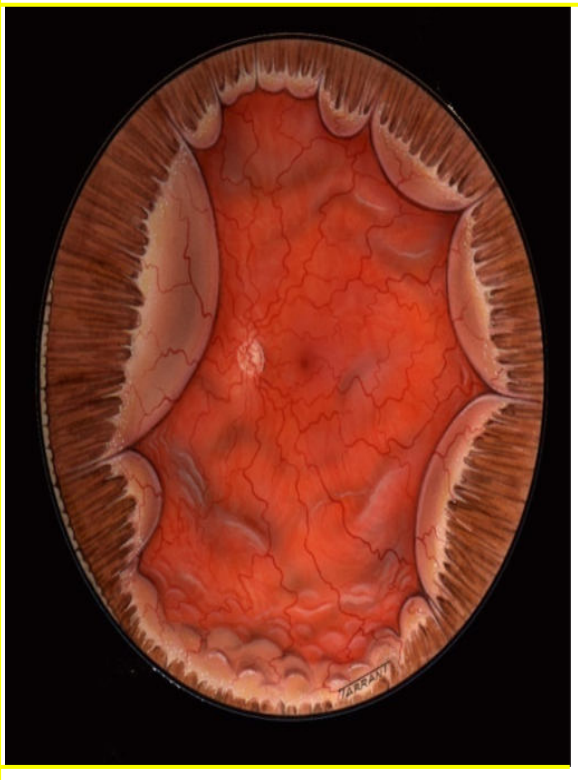
Complications

- Proliferative vitreo retinopathy(PVR)
- Complicated cataract
- Uveitis
- Phthisi bulbi

Proliferative vitreoretinopathy

Grade A (minimal)	Grade B (moderate)	Grade C (severe)
		
• Vitreous haze and tobacco dust	• Retinal wrinkling and stiffness • Rolled edges of tears	• Rigid retinal folds • Vitreous condensations and strands

Differential diagnosis of RD

Degenerative retinoschisis	Choroidal detachment	Uveal effusion syndrome
		
• Frequently bilateral • Smooth, thin and immobile • Occasionally breaks in one or both layers	• Associated with hypotony • Unilateral, brown, smooth, solid and immobile • Ora serrata may be visible	• Idiopathic • Rare, unilateral • Combined choroidal & exudative detachments

Aims of management of RD

- Seal/close retinal breaks with photocoagulation or cryotherapy (or diathermy – Jules Gonin -Ignipuncture)

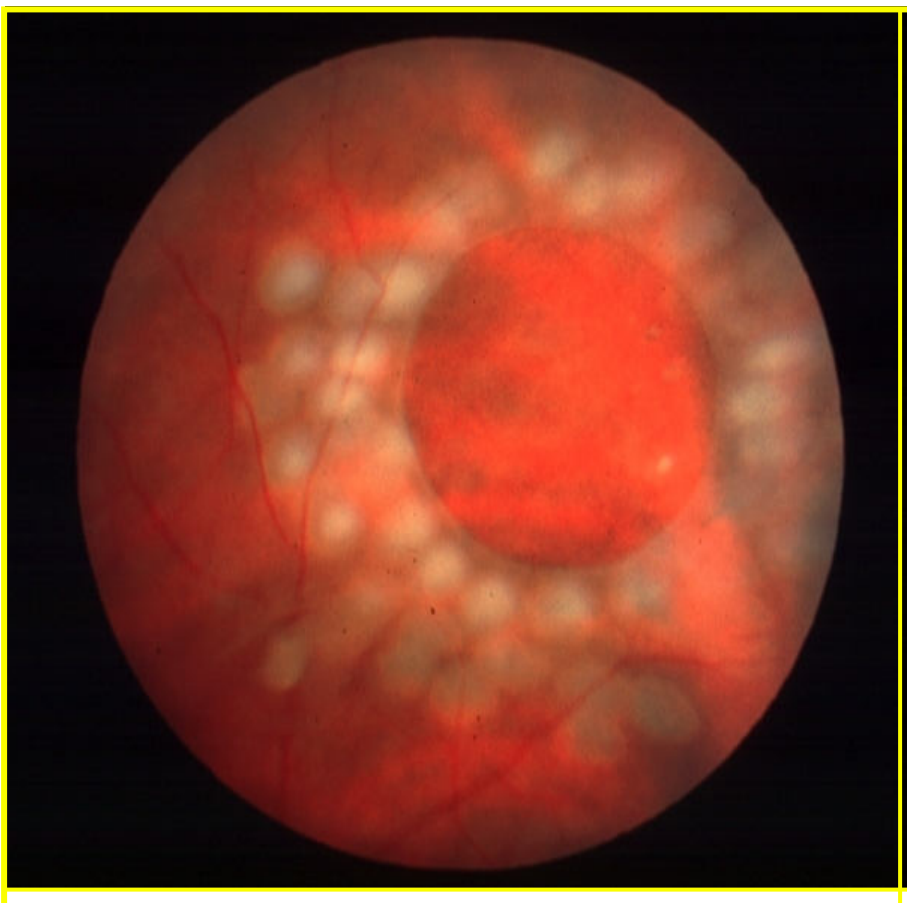
- Sub Retinal Fluid drainage : for immediate apposition between sensory retina and RPE (Not in all cases)

Aims of management of RD

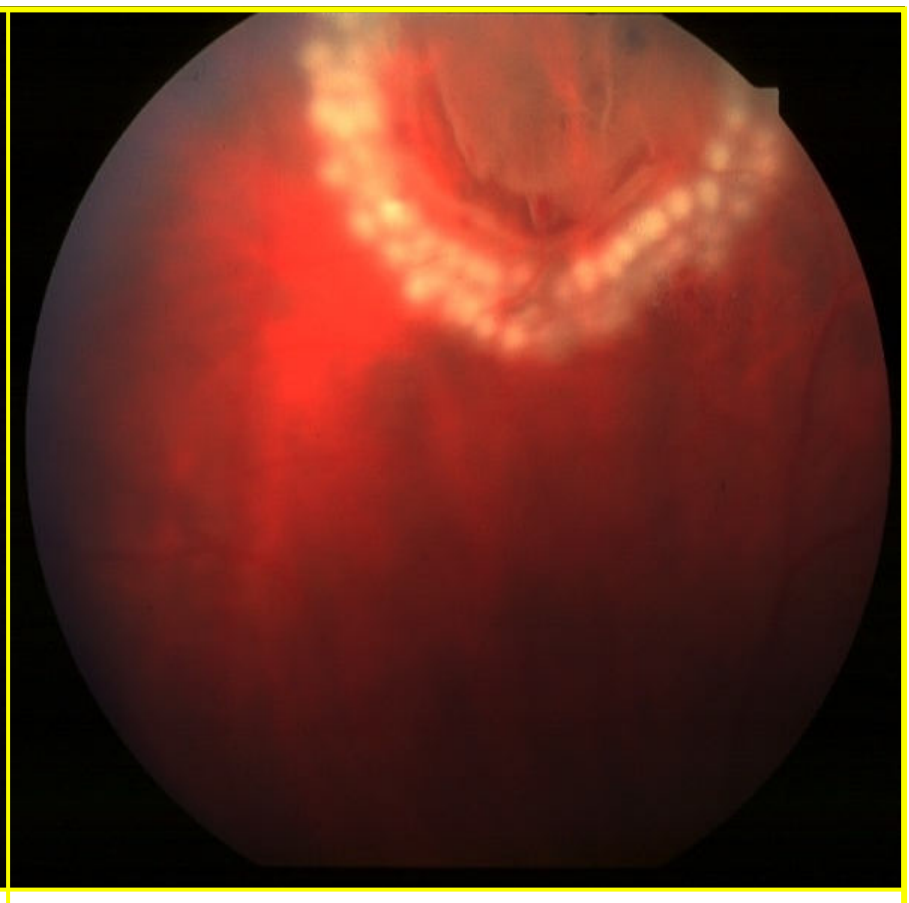
- Maintain chorioretinal apposition/adhesion by

1. Scleral Buckling to provide external tamponade
2. Pneumatic retinopexy
3. Pars plana vitrectomy (to relieve traction on retina)

Technique of laser photocoagulation

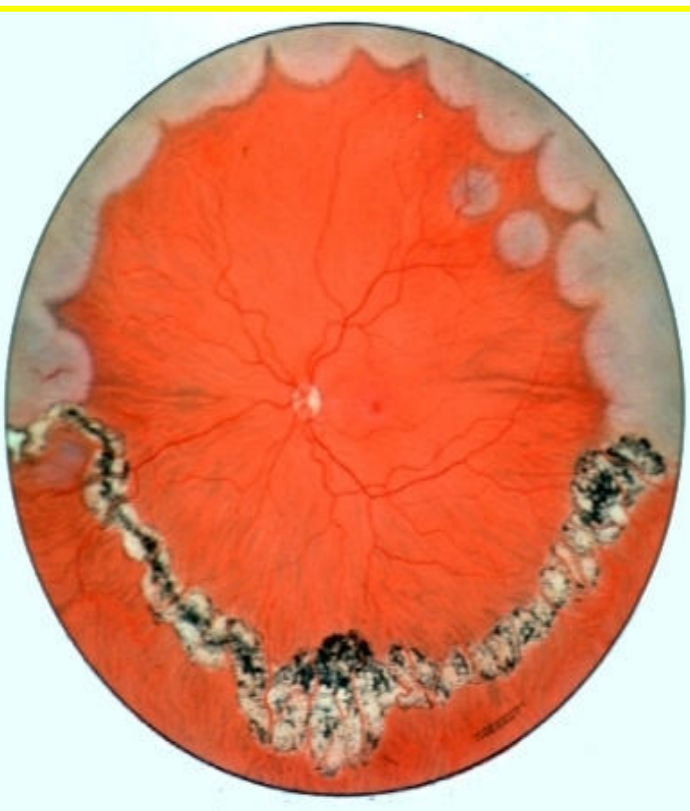


Surround lesion with two rows of confluent burns



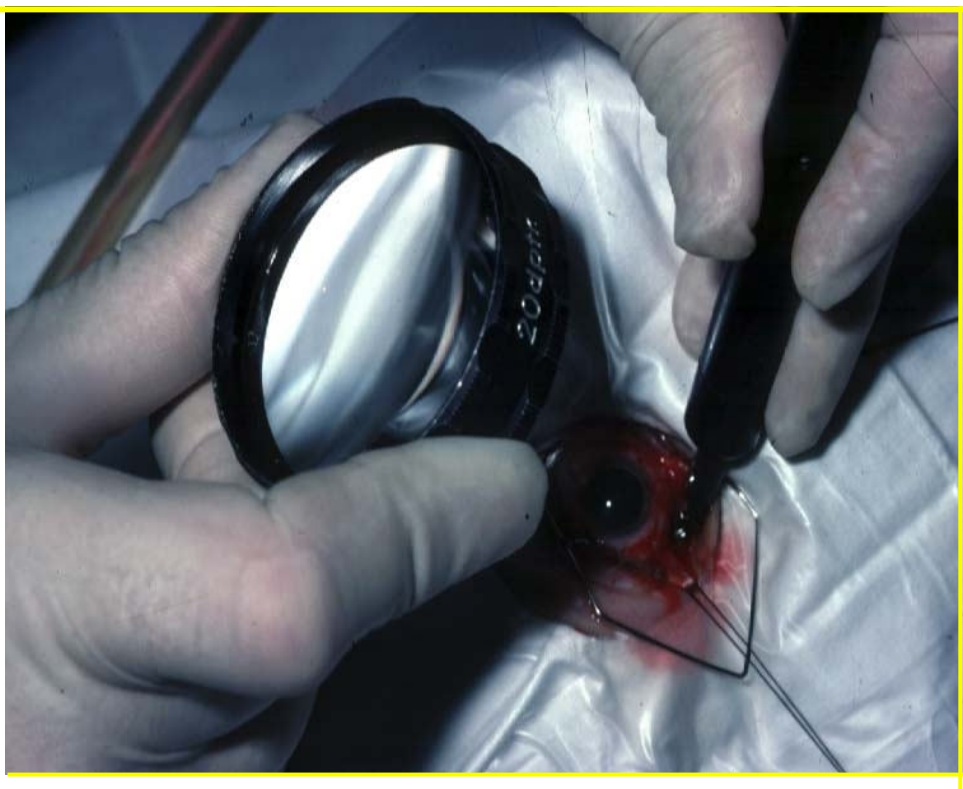
Difficult for anterior lesions and if media hazy

Technique of cryotherapy

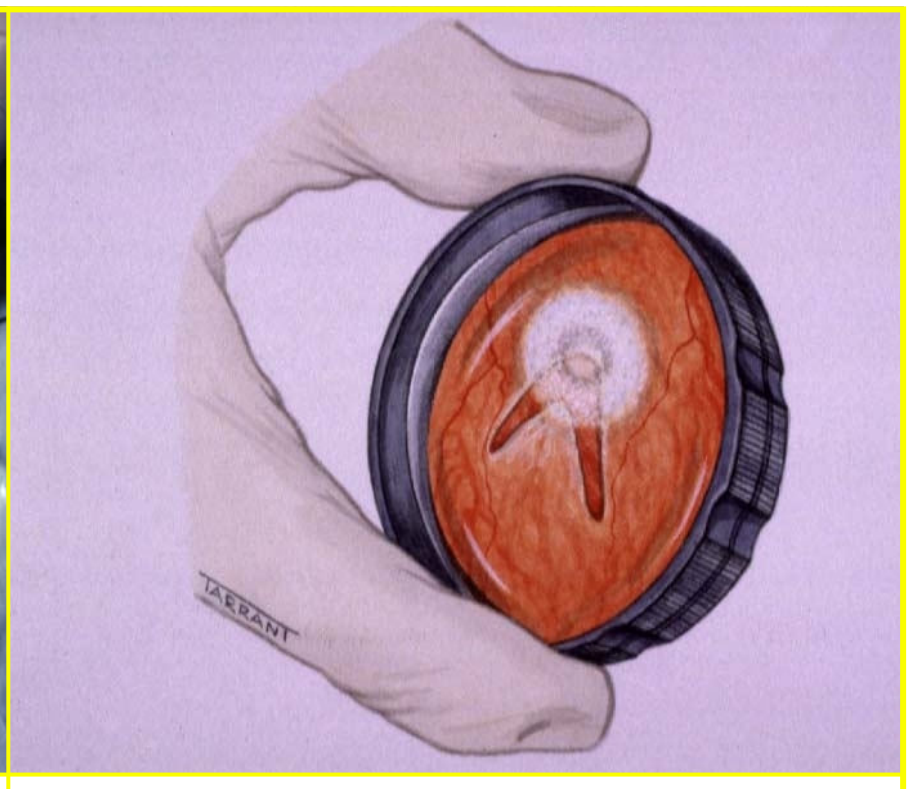


- Surround lesion with single row of cryo-applications
- Preferred for treatment of large areas

Cryotherapy



While viewing with indirect ophthalmo-Scope indent sclera gently with tip of cryoprobe



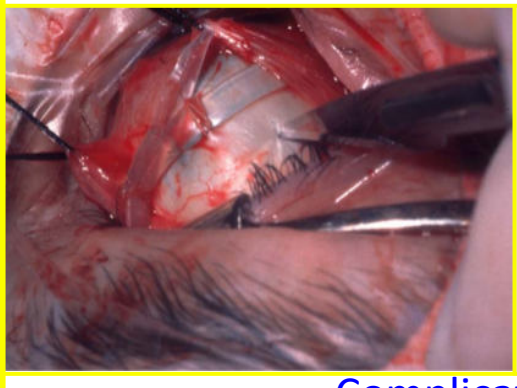
Freeze break until sensory retina just turns white

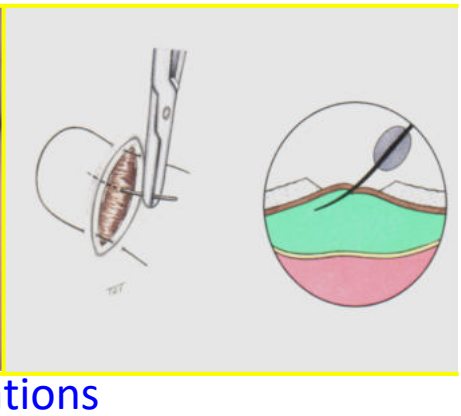
Drainage of subretinal fluid

Indications

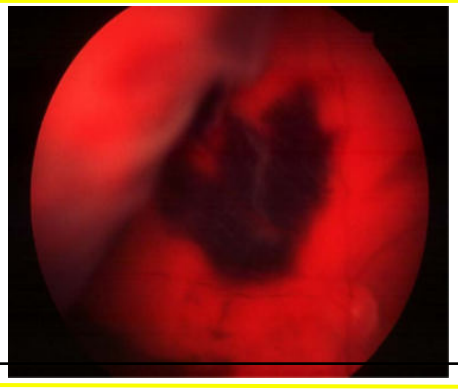
- Difficulty in localizing break
- Immobile retina
- Longstanding RD
- Inferior RD

Technique

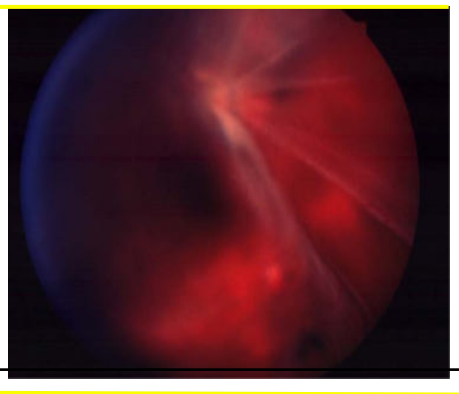




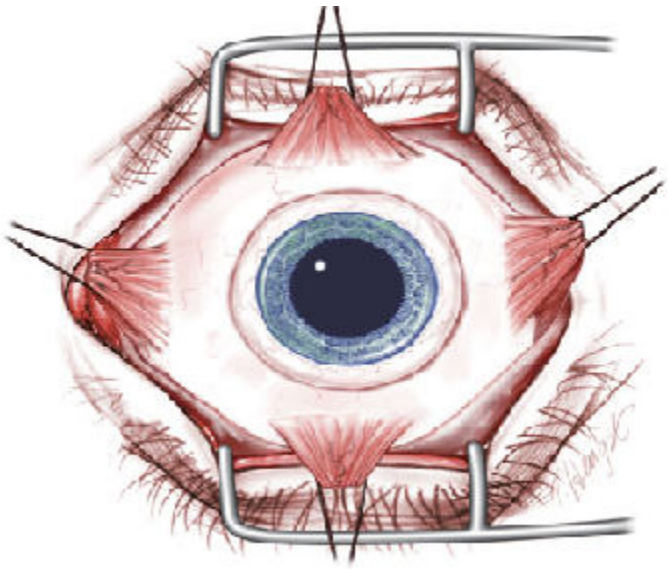
Complications

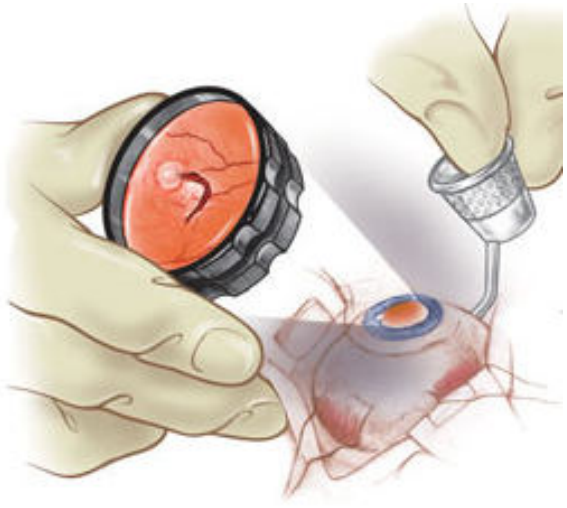


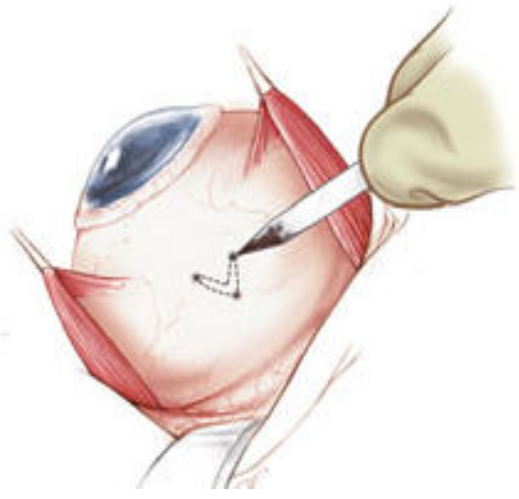
Haemorrhage

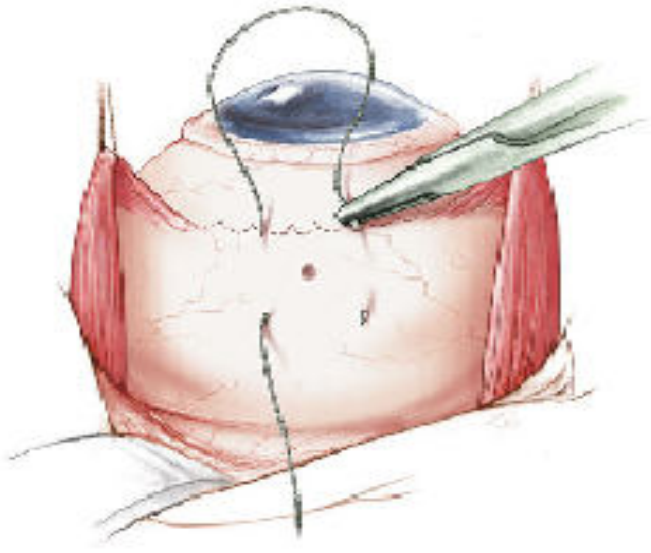


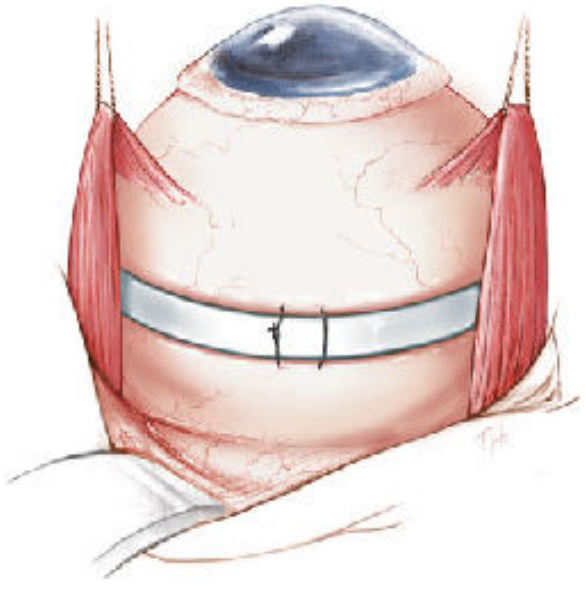
Retinal incarceration

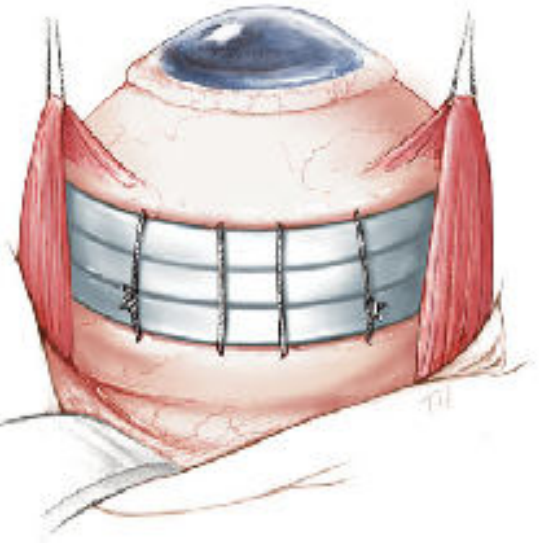




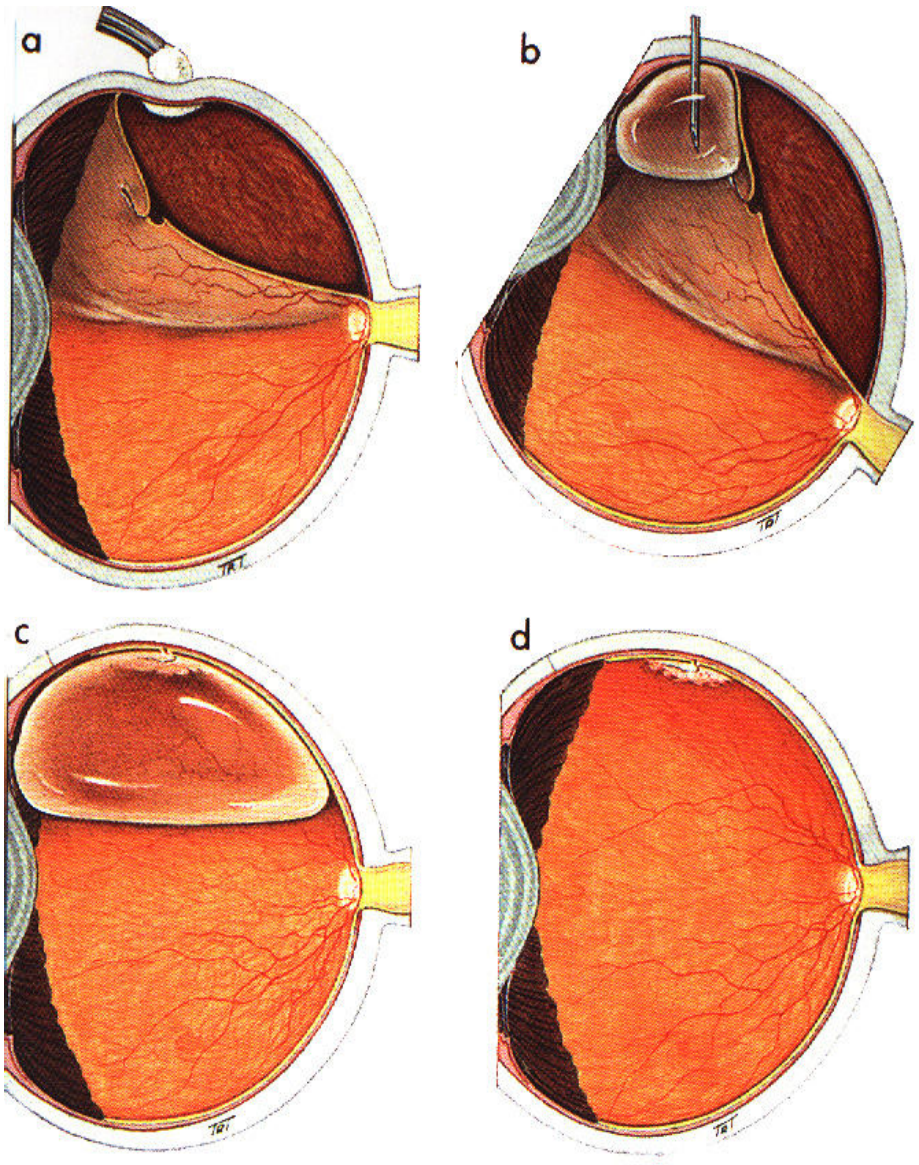








Pneumatic retinopexy



Indications

RD with superior breaks

Technique

(a) Cryotherapy

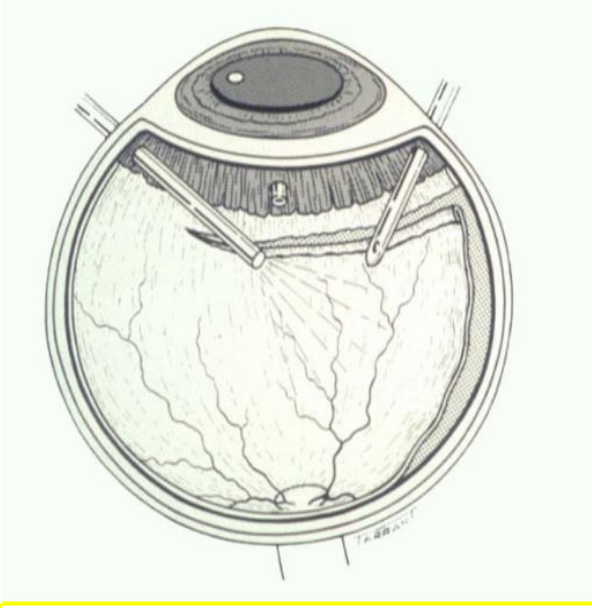
(b) Gas injection

(c) Postoperative positioning

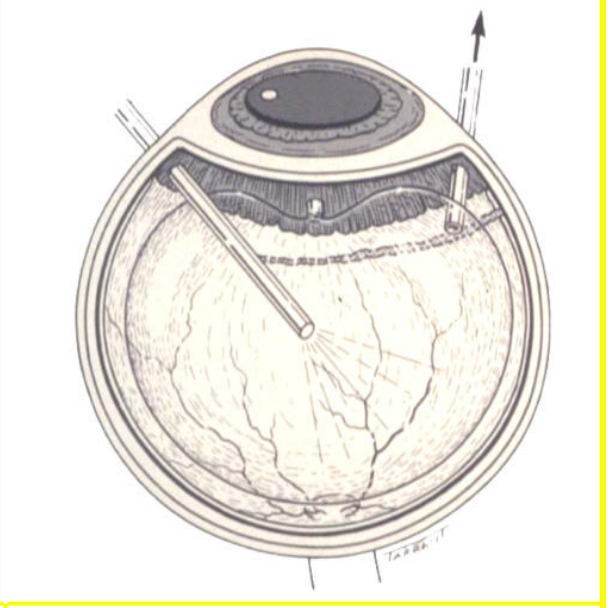
(d) Flat retina

Vitrectomy for giant tears

Unrolling of flap with light pipe and probe



Completion of unrolling



Injection of silicone oil or heavy liquid

Vitrectomy for PVR

- Dissection of star folds and peeling of membranes
- Injection of expanding gas or silicone oil

Tractional Retinal detachment

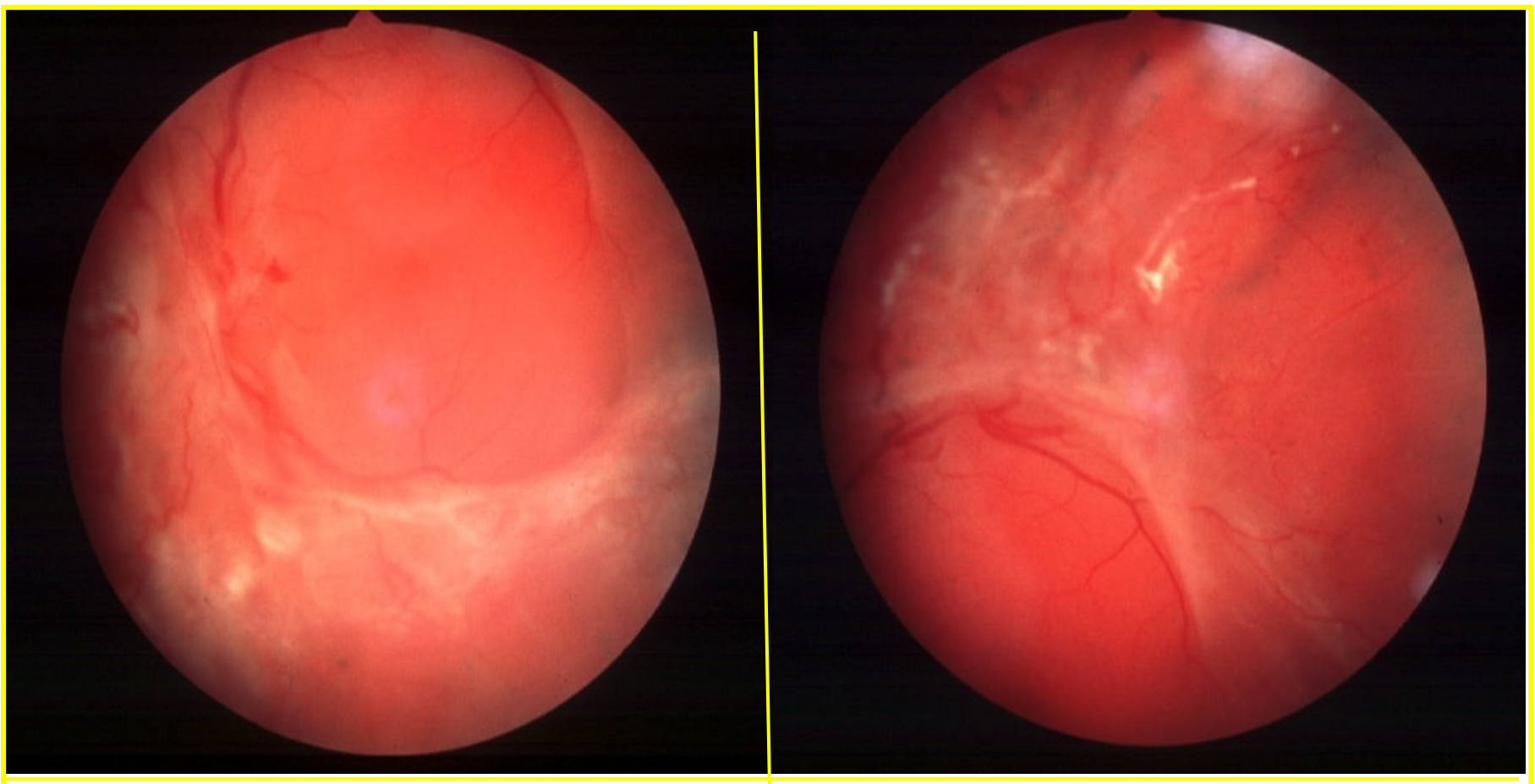
- Occurs due to mechanical pull/traction on the retina by contraction of fibrous tissue in the vitreous.
- Etiology

➢ Proliferative Diabetic Retinopathy (PDR)

➢ Penetrating posterior segment trauma

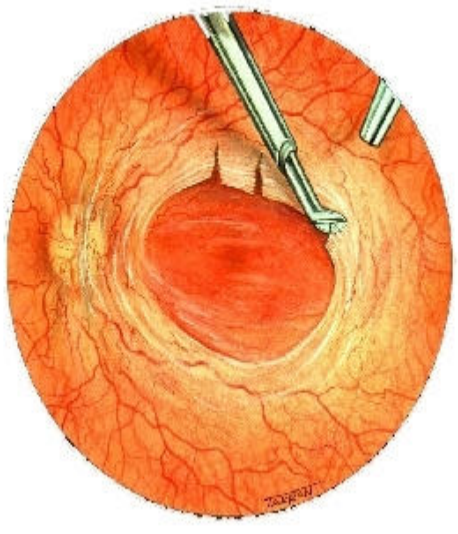
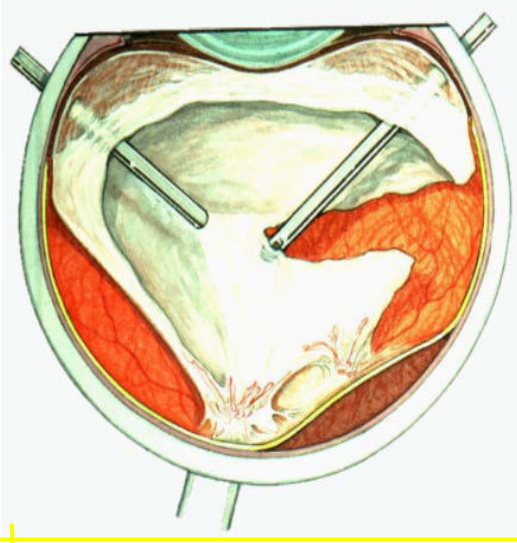
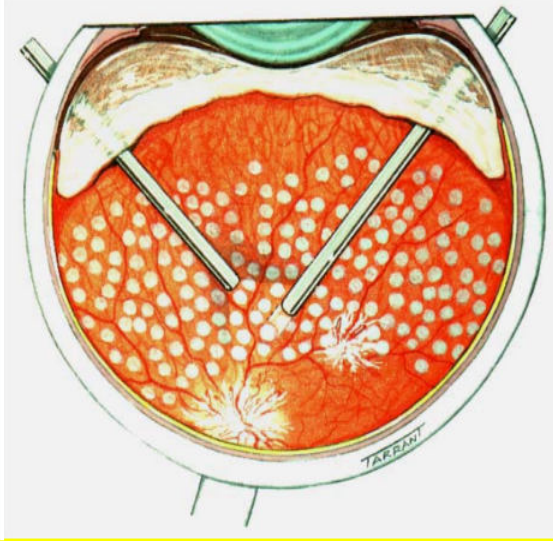
➢ Retinopathy of prematurity

Signs of tractional RD



- Concave, shallow immobile elevation
- Highest at sites of vitreoretinal traction
- Slow progression and variable fibrosis
- Does not extend to ora serrata

Vitrectomy for tractional RD

		
Release of circumferential traction	Release of antero-posterior traction	Endophotocoagulation

Exudative Retinal detachment

- Occurs due to the retina being pushed away by a neoplasm or fluid accumulation beneath the retina following inflammatory or vascular lesions.

Pathogenesis and Causes of Exudative RD

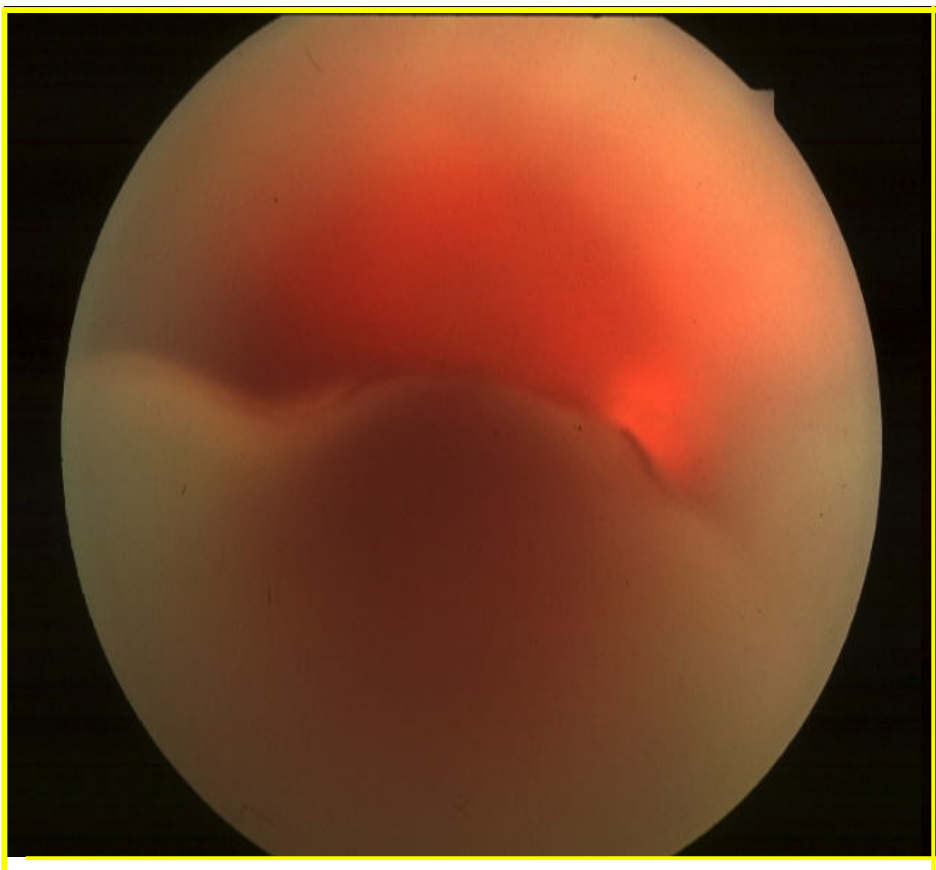
- Damage to RPE by subretinal disease
- Passage of fluid derived from choroid into subretinal space

1. Choroidal tumours
   - Primary
   - Metastatic
2. Intraocular inflammation
   - Harada's Disease
   - Posterior Scleritis
3. Intraocular inflammation
   - Toxemia of pregnancy
   - Hypoproteinemia

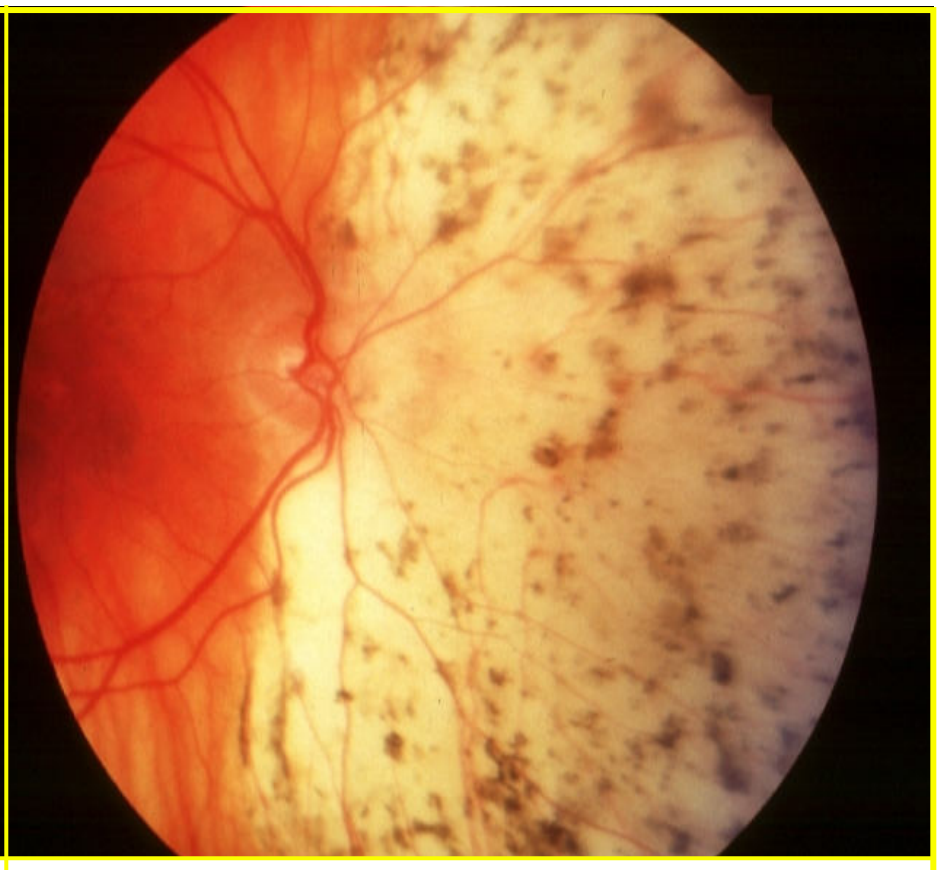
Pathogenesis and Causes of Exudative RD

4. Vascular
   - CSR
   - Coat's disease
5. Iatrogenic
   - RD surgery
   - Excessive retinal photocoagulation
6. Miscellaneous
   - Choroidal neovascularization
   - Uveal effusion syndrome
   - Nanophthalmos

Signs of exudative RD



- Convex, smooth elevation
- May be very mobile and deep with shifting fluid



- Subretinal pigment (leopard spots) after flattening

Medical Management

- Inflammatory conditions
  (such as scleritis and Vogt-Koyanagi-Harada syndrome)
  anti-inflammatory agents.
- Tumors-

❖ External beam radiation therapy or brachytherapy with a plaque may be used for choroidal melanoma.

❖ Metastatic lesions respond to chemotherapy or localized radiation therapy.

❖ Choroidal hemangiomas may respond to laser photocoagulation or plaque brachytherapy.

❖ Retinoblastomas may be shrunk with chemotherapy and then treated locally with heat, laser, or cryotherapy.

Medical Management

- Infectious aetiologies -antibiotics.
- Exudative retinal detachments secondary to chronic renal failure may have spontaneous retinal reattachment following renal transplant or renal dialysis.
- Anti-VEGF agents -Coats disease.

Surgical Management

- Conditions with vascular anomalies, such as Coats disease-laser- cryotherapy

  vitrectomy

- Congenital anomalies, such as optic pits or colobomas

  -vitrectomy and endolaser techniques.

Differences between types of RD

	Rhegmatogenous	Tractional	Exudative/serous
Hole/Break	+	-	-
Surface	Convex, corrugated	Concave, scalloped	Convex, smooth
SRF shift	Rare	---	Shifting SRF
Height of RD	Never reaches lens	Shallow	May reach/touch lens
Course	Progressive/Static	Progressive	Waxes/wanes May resolve by itself
Management	Surgical	Surgical	Medical/ surgical

Conclusion

- Retinal Detachment is defined as the separation of neurosensory retina (NSR) from retinal pigment epithelium (RPE).
- It may be rhegmatogenous, tractional or exudative.
- Is one of the causes of significant visual loss.
- Management is mainly surgical.