What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

1) Find all **two words**
What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

1) Find all **retinal breaks**
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2) Induce an inflammatory response in the immediately surrounding the break
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all retinal breaks
2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
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3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any that may be present.
What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

1) Find all **retinal breaks**

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**Failing to accomplish one (or more) of these is the most common cause of RD surgery failure in the early post-op period!**
What three things *must* be accomplished to successfully repair a rhegmatogenous RD?

1) **Find all retinal breaks**

Regarding finding retinal breaks, to what does the term Lincoff rules refer?
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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How do one think about the eye vis a vis determining configuration?
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Pretend the ONH is at the center of the retina. Relative to the ONH, an RD can be **Superior** (ie, a substantial portion is well above a horizontal line drawn through the ONH), **Inferior** (the RD doesn’t cross that line, or does so minimally), and **Nasal** and **Temporal** (with respect to a *vertical* line through the ONH).
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Per Lincoff’s rules, there are RD configurations.
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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Per Lincoff’s rules, there are four RD configurations.

1) 
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1) A superior RD that does not cross the 12 o’clock meridian  
2) A superior RD that *does* cross the 12 o’clock meridian  
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4) Rhegmatogenous RD Repair
What three things \textit{must} be accomplished to successfully repair a rhegmatogenous RD?

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2) A superior RD that \textit{does} cross the 12 o’clock meridian
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What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

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What three things must be accomplished to successfully repair a rhegmatogenous RD?

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What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

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*Per Lincoff’s rules, there are four RD configurations: What are they?*

1) **A superior RD that does not cross the 12 o’clock meridian**
2) A superior RD that *does* cross the 12 o’clock meridian
3) An inferior RD that is ‘typical’ in appearance
4) An inferior RD that appears ‘bullous’
#1: In a superior RD that does not cross the 12 o’clock meridian, the break is within 1.5 clock-hours of the uppermost border of whichever side (ie, nasal vs temporal) of the RD is higher
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all **retinal breaks**

Regarding finding retinal breaks, to what does the term Lincoff rules refer? It refers to a set of guidelines for determining the location of the retinal break responsible for a RRD based on the configuration of the detachment.

**How do one think about the eye vis a vis determining configuration?**

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*If the RD is superior and crosses 12 o’clock, where is the break?*

1) A superior RD that does not cross the 12 o’clock meridian

2) **A superior RD that does cross the 12 o’clock meridian**

3) An inferior RD that is ‘typical’ in appearance

4) An inferior RD that appears ‘bullous’
What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

1) **Find all retinal breaks**

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   *If the RD is superior and crosses 12 o’clock, where is the break?* It is within 1.5 clock-hours of straight-up 12 o’clock.

   *Per Lincoff’s rules, there are 4 RD configurations. What are they?*

   1) A superior RD that does not cross the 12 o’clock meridian
   2) **A superior RD that does cross the 12 o’clock meridian**
   3) An inferior RD that is ‘typical’ in appearance
   4) An inferior RD that appears ‘bullous’
#2: In a superior RD that *does* cross the 12 o’clock meridian, the break *is within 1.5 clock-hours of straight-up 12 o’clock*
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all retinal breaks

Regarding finding retinal breaks, to what does the term Lincoff rules refer? It refers to a set of guidelines for determining the location of the retinal break responsible for a RRD based on the configuration of the detachment.

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Per Lincoff:

If the RD is inferior and ‘typical’ in appearance, where is the break?

1) A superior RD that does not cross the 12 o’clock meridian
2) A superior RD that does cross the 12 o’clock meridian
3) An inferior RD that is ‘typical’ in appearance
4) An inferior RD that appears ‘bullous’
What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

1) Find **all** retinal breaks

*Regarding finding retinal breaks, to what does the term Lincoff rules refer?*

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*Per Lincoff’s rules, there are four RD configurations. What are they?*

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What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

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*Per Lincoff*:

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2) A superior RD that *does* cross the 12 o’clock meridian
3) An inferior RD that is ‘typical’ in appearance
4) An inferior RD that appears ‘bullous’

*If the RD is inferior and ‘typical’ in appearance, where is the break?*

It is on whichever side (ie, nasal vs temporal) of the RD is higher
#3: In an inferior RD that is ‘typical’ in appearance, the break is on whichever side (ie, nasal vs temporal) of the RD is higher
What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

1) Find **all** retinal breaks

Regarding finding retinal breaks, to what does the term Lincoff rules refer? It refers to a set of guidelines for determining the location of the retinal break responsible for a RRD based on the configuration of the detachment.

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If the RD is inferior and ‘bullous,’ where is the break?

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What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

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If the RD is inferior and ‘bullous,’ where is the break? Counterintuitively, it is **superior**, with the liquid vitreous tracking inferiorly via an occult peripheral retinal sinus.

3) An inferior RD that is ‘typical’ in appearance

4) An inferior RD that appears ‘bullous’
#4: In a bullous inferior RD, the break is superior, with the liquid vitreous tracking inferiorly via a peripheral retinal sinus.
The Lincoff Rules
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all **retinal breaks**

2) Induce an **inflammatory response in the chorioretinal tissue** immediately surrounding the break

3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a **chorioretinal scar**, which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any vitreoretinal traction that may be present.

**What are the two main surgical approaches for inducing the inflammatory response?**

---
What three things **must** be accomplished to successfully repair a rhegmatogenous RD?

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What are the two main surgical approaches for inducing the inflammatory response?

--Laser

--Transscleral cryotherapy
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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What are the surgical approaches to accomplishing this step?

-?
-?
-?
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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What are the surgical approaches to accomplishing this step?
--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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How do a SB bring the retina and underlying tissue into apposition?

By indenting the sclera underlying the retinal break. Indention pushes the subretinal tissue in the direction of the detached retina. It may also dissipate vitreoretinal traction.

What are the surgical approaches to accomplishing this step?

--Scleral buckle (SB)
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Rhegmatogenous RD Repair

Scleral buckling
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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By indenting the sclera underlying the retinal break. Indention pushes the subretinal tissue in the direction of the detached retina. It may also dissipate vitreoretinal traction.

Are all SBs circumferential, ie, do they encircle the entire globe?

If the globe is squeezed circumferentially, the resulting increase in A-P length produces axial myopia.

Are all SBs circumferential, ie, do they encircle the entire globe?
They can, but more often are segmental.

Are they always oriented parallel to the equator of the globe?
No, on occasion the retinal break(s) dictates radial placement.
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a chorioretinal scar, which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any vitreoretinal traction that may be present.

What are the surgical approaches to accomplishing this step?

--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)

How does a SB bring the retina and underlying tissue into apposition?

By indenting the sclera underlying the retinal break. Indention pushes the subretinal tissue in the direction of the detached retina. It may also dissipate vitreoretinal traction.

What effect does SB have on the refractive state of the eye?

A myopic shift often results. Why does a myopic shift occur?

If the globe is squeezed circumferentially, the resulting increase in axial length produces axial myopia.
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all retinal breaks
2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
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If the globe is squeezed circumferentially, the resulting increase in A-P length produces axial myopia.

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What three things must be accomplished to successfully repair a rhegmatogenous RD?

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2) Induce an inflammatory response in the choriorretinal tissue immediately surrounding the break
3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a choriorretinal scar, which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any vitreoretinal traction that may be present.

How does a SB bring the retina and underlying tissue into apposition?
By indenting the sclera underlying the retinal break. Indention pushes the subretinal tissue in the direction of the detached retina. It may also dissipate vitreoretinal traction.

What effect does SB have on the refractive state of the eye?
A myopic shift often results

Why does a myopic shift occur?
The globe is noncompressible, so reducing its equatorial diameter produces a proportionate increase in its axial length. This increase in AL causes the myopic shift.

What are the surgical approaches to accomplishing this step?
--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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What effect does SB have on the refractive state of the eye? A myopic shift often results.

Which method of ‘inflammation induction’ (ie, laser or cryo) is usually used in conjunction with SB surgery? Cryo
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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What are the surgical approaches to accomplishing this step?

--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)

Briefly, how is a PPV performed?
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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What are the surgical approaches to accomplishing this step?

--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)

Briefly, how is a PPV performed?

Three spaced-apart stab incisions are made through the sclera and pars plana portion of the ciliary body. Via these incisions, a light source, irrigation cannula and vitreous cutter are introduced into the vitreous cavity. The cutter is used to remove the vitreous gel.
Rhegmatogenous RD Repair

PPV
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
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What are the surgical approaches to accomplishing this step?

-- Scleral buckle (SB)
-- Pars plana vitrectomy (PPV)
-- Pneumatic retinopexy (PR)

How does a PPV bring the retina and underlying tissue into apposition?
The vitreous overlying a retinal break is the source of traction that pulls the retina away from the underlying tissue. In a PPV, the vitreous—and hence the source of this traction—is removed.

Briefly, how is a PPV performed?
Three spaced-apart stab incisions are made through the sclera and pars plana portion of the ciliary body. Through these incisions, a light source, irrigation cannula and vitreous cutter are introduced into the vitreous cavity. The cutter is used to remove the vitreous gel.
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That’s all there is to it--remove the vitreous, and the retinal simply falls back in place?

Briefly, how is a PPV performed?

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A

Rhegmatogenous RD Repair

What three things must be accomplished to successfully repair a rhegmatogenous RD?

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Rhegmatogenous RD Repair

To repair a rhegmatogenous RD, three things must be accomplished:

1) Find all retinal breaks
2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a chorioretinal scar, which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any vitreoretinal traction that may be present.

The surgical approaches to accomplishing this step are:

- Scleral buckle (SB)
- Pars plana vitrectomy (PPV)
- Pneumatic retinopexy (PR)

How does a PPV bring the retina and underlying tissue into apposition?
The vitreous overlying a retinal break is the source of traction that pulls the retina away from the underlying tissue. In a PPV, the vitreous—and hence the source of this traction—is removed.

That’s all there is to it—remove the vitreous, and the retinal simply falls back in place? Well, no. A substance (usually a gas or an oil) must be introduced into the vitreous cavity to promote and maintain apposition.

Which method of ‘inflammation induction’ (ie, laser or cryo) is usually used in conjunction with PPV surgery?

Briefly, how is a PPV performed?

Three spaced-apart stab incisions are made through the sclera and pars plana portion of the ciliary body. Through these incisions, a light source, irrigation cannula and vitreous cutter are introduced into the vitreous cavity. The cutter is used to remove the vitreous gel.
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a chorioretinal scar, which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any vitreoretinal traction that may be present.

What are the surgical approaches to accomplishing this step?

--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)

How does a PPV bring the retina and underlying tissue into apposition?
The vitreous overlying a retinal break is the source of traction that pulls the retina away from the underlying tissue. In a PPV, the vitreous—and hence the source of this traction—is removed.

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Which method of ‘inflammation induction’ (ie, laser or cryo) is usually used in conjunction with PPV surgery?

Laser

Briefly, how is a PPV performed?
Three spaced-apart stab incisions are made through the sclera and pars plana portion of the ciliary body. Through these incisions, a light source, irrigation cannula and vitreous cutter are introduced into the vitreous cavity. The cutter is used to remove the vitreous gel.
What are the surgical approaches to accomplishing this step?

- Scleral buckle (SB)
- Pars plana vitrectomy (PPV)
- Pneumatic retinopexy (PR)

What is the basic procedure in PR?

It is as simple as it is elegant. A gas (air; SF$_6$; C$_3$F$_8$) is injected into the vitreous cavity. The floating gas bubble pushes against the RD, and in doing so forces the subretinal fluid back out through the break, as well as pushes the retinal-break region into apposition against the underlying tissue. All via a simple office procedure!

Sounds great! Why not do this for all rhegmatogenous RDs?

Unfortunately, not all RRDs are good candidates for PR. To qualify for PR, the RD should have the following characteristics:

- **Number of breaks**: Ideally there is only one, but if more than one are present, they must be few in number and all located within 1-2 clock hours of each other.
- **Location of breaks**: The break(s) must be located between 4 and 8 o'clock.
- **Vitreoretinal traction status**: There must be none, or very little.
- **Pt factor**: The patient must be willing and able to maintain the (possibly awkward) head position needed to keep the gas bubble pressing against the retinal break.
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all retinal breaks
2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a chorioretinal scar, which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any vitreoretinal traction that may be present.

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--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)

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Rhegmatogenous RD Repair

Pneumatic retinopexy
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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What are the surgical approaches to accomplishing this step?

--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)

What is the basic procedure in PR?

It is as simple as it is elegant. A gas (air, SF₆, C₃F₆) is injected into the vitreous cavity. The floating gas bubble pushes against the RD, and in doing so forces the subretinal fluid back out through the break, as well as pushes the retinal-rhegmatogenous detachment against the underlying tissue. All via a simple office procedure!

What are the names of these gases?

SF₆, C₃F₆

What are the surgical approaches to accomplishing this step?
What three things must be accomplished to successfully repair a rhegmatogenous RD?

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What are the names of these gases?
SF$_6$: Sulfur hexafluoride
C$_3$F$_8$: Perfluoropropane
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all retinal breaks
2) Induce an inflammatory response in the choriretinal tissue immediately surrounding the break
3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a choriretinal scar, which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any vitreoretinal traction that may be present.

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Rhegmatogenous RD Repair
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--- **Location of breaks**: The break(s) must be located between 4 and 8 o’clock
--- **Vitreoretinal traction status**: No vitreoretinal traction that may be present.

Rhegmatogenous RD Repair
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all retinal breaks
2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
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--**Pt factor**: The patient must be willing and able to maintain the (possibly awkward) head position needed to keep the gas bubble pressing against the retinal break.

What are the surgical approaches to accomplishing this step?
--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--**Pneumatic retinopexy (PR)**

---

Rhegmatogenous RD Repair
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all retinal breaks
2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
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--- **Location of breaks**: The break(s) must be located between 4 and 8 o’clock
--- **Vitreoretinal traction status**: There must be none, or very little
--- **Pt factor**: The patient must be willing and able to maintain the (possibly awkward) head position needed to keep the gas bubble pressing against the retinal break

What are the surgical approaches to accomplishing this step?

--- Scleral buckle (SB)
--- Pars plana vitrectomy (PPV)
--- **Pneumatic retinopexy (PR)**
Pneumatic retinopexy: Head positioning
What three things must be accomplished to successfully repair a rhegmatogenous RD?

1) Find all retinal breaks
2) Induce an inflammatory response in the chorioretinal tissue immediately surrounding the break
3) Bring the inflamed choroid and retinal tissue into apposition long enough to allow formation of a chorioretinal scar, which will act as a barrier between the break and the subretinal space. Note that accomplishing this requires eliminating any vitreoretinal traction that may be present.

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--Scleral buckle (SB)
--Pars plana vitrectomy (PPV)
--Pneumatic retinopexy (PR)

What is the basic procedure in PR?

It is as simple as it is elegant. A gas (air; SF₆, C₃F₈) is injected into the vitreous cavity. The floating gas bubble pushes against the RD, and in doing so forces the subretinal fluid back out through the break, as well as pushes the retinal-break region into apposition against the underlying tissue. All via a simple office procedure!

Sounds great! Are all RDs candidates for PR?

Far from it, unfortunately. To qualify for PR, the RD should have the following characteristics:

- Ideally there is only one retinal break. But if more than one are present, they must be few in number, and all must lie within 1-2 clock-hours of each other.
- The break(s) must be located superiorly (upper 1/3 of retina).
- Vitreoretinal traction must be minimal.
- The patient must be willing and able to adopt and maintain the (possibly awkward) head position needed to keep the gas bubble pressing against the retinal break.

Which method of ‘inflammation induction’ (ie, laser or cryo) is usually used in conjunction with PR?

Laser
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What’s the most common cause of failure in the late post-op period?

Failing to accomplish one (or more) of these is the most common cause of RD surgery failure in the late post-op period!
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What does PVR stand for in this context?

Development of PVR leads to vitreo-retinal traction—and we’re right back where we started…
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What does PVR stand for in this context?

Proliferative vitreoretinopathy

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**Q/A**

**Rhegmatogenous RD Repair**

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Proliferative vitreoretinopathy

By what mechanism does PVR cause late RD repair failure?
It leads to **vitreo-retinal traction** — and we're right back where we started…

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**PVR**

What’s the most common cause of RD surgery failure in the late post-op period?