

Retinal Displacement following Pneumatic Retinopexy vs Pars Plana Vitrectomy for Retinal Detachment Repair (ALIGN STUDY)

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SUMMARY

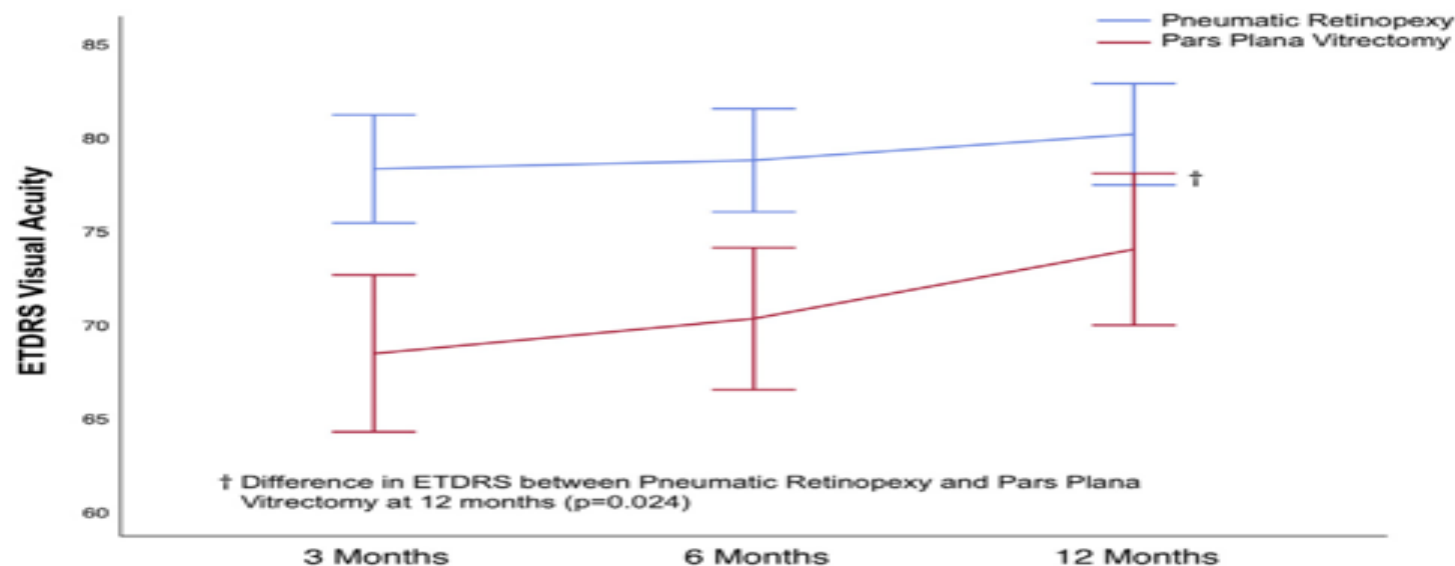
- ALIGN was a prospective multicenter cohort study comparing post-operative retinal displacement in PPV vs PnR
- Low integrity retinal attachment (LIRA) is defined by the presence of retinal vessel printings (RVPs) on FAF imaging
- Retinal displacement/LIRA occurs more commonly in patients undergoing PPV compared to PnR
- Aniseikonia is more common following successful PPV vs successful PnR



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The Pneumatic Retinopexy versus Vitrectomy for the Management of Primary Rhegmatogenous Retinal Detachment Outcomes Randomized Trial (PIVOT)

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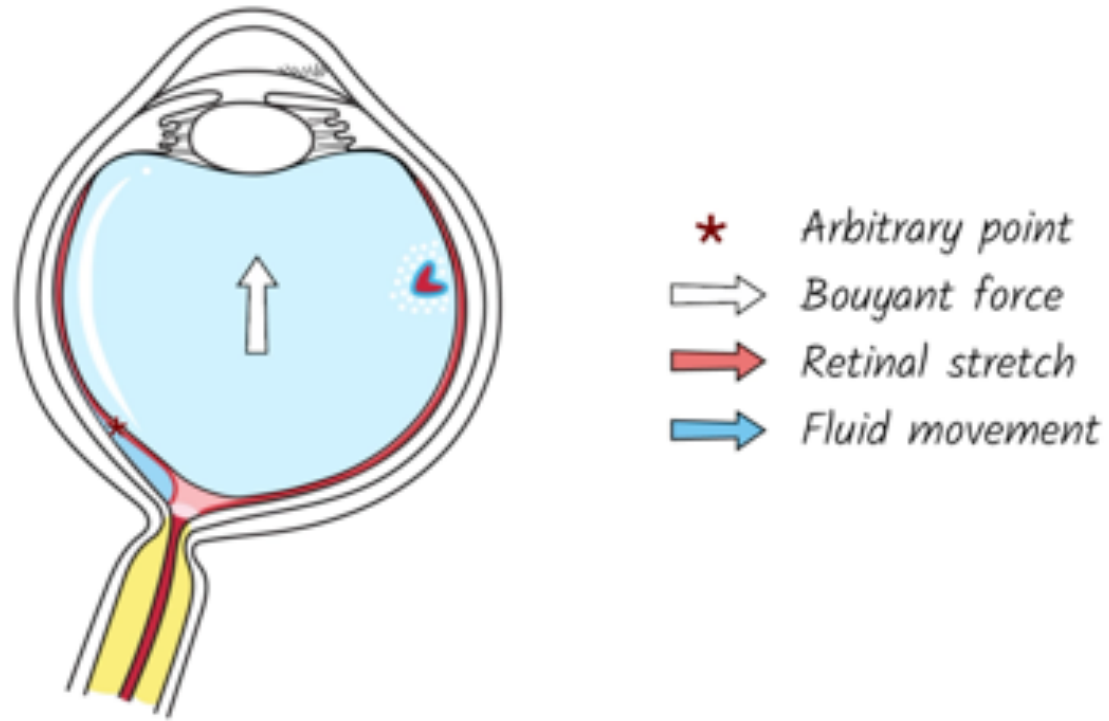


A grayscale fundus photograph of a retina. The optic disc is visible on the left side, with a network of retinal vessels radiating outwards. A dark, irregular lesion is present in the central macular area. The overall image has a grainy, high-contrast appearance.

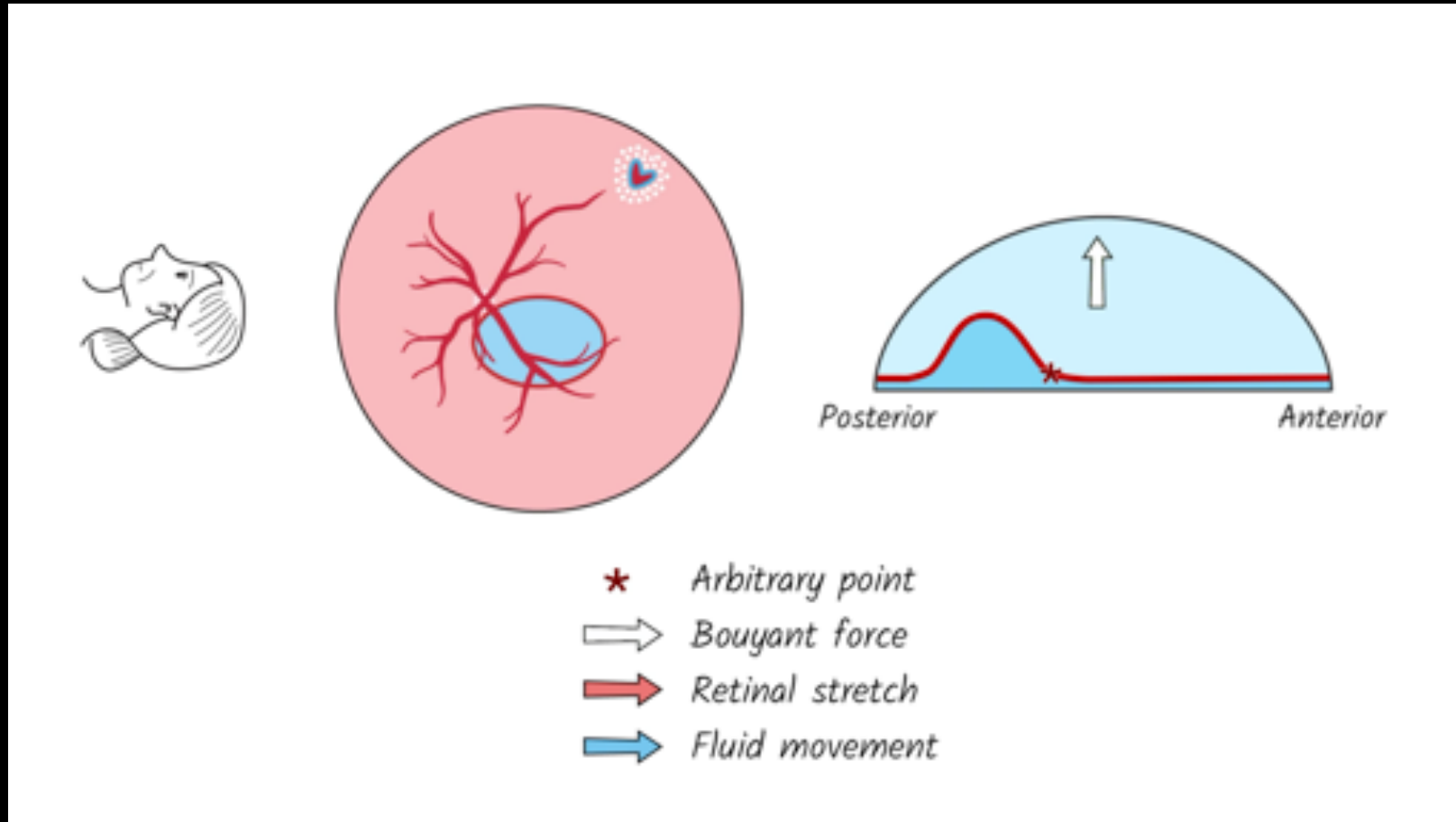
LIRA

Low Integrity Retinal re-Attachment

Mechanism of Retinal Displacement in PPV



Mechanism of Retinal Displacement in PPV



JAMA Ophthalmology | **Original Investigation**

Retinal Displacement Following Pneumatic Retinopexy vs Pars Plana Vitrectomy for Rhegmatogenous Retinal Detachment

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 [Video](#)

IMPORTANCE Retinal displacement following rhegmatogenous retinal detachment repair may have consequences for visual function. It is important to know whether surgical technique is associated with risk of displacement.

OBJECTIVE To compare retinal displacement following rhegmatogenous retinal detachment repair with pneumatic retinopexy (PR) vs pars plana vitrectomy (PPV).

INTERVENTIONS OR EXPOSURES Fundus autofluorescence images were assessed by graders masked to surgical technique.

DESIGN, SETTING, AND PARTICIPANTS A multicenter retrospective consecutive case series in Canada and the UK. A total of 238 patients (238 eyes) with rhegmatogenous retinal detachments treated with PR or PPV who underwent fundus autofluorescence imaging from November 11, 2017, to March 22, 2019, were included.

MAIN OUTCOMES AND MEASURES Proportion of patients with retinal displacement detected by retinal vessel printings on fundus autofluorescence imaging in PR vs PPV.

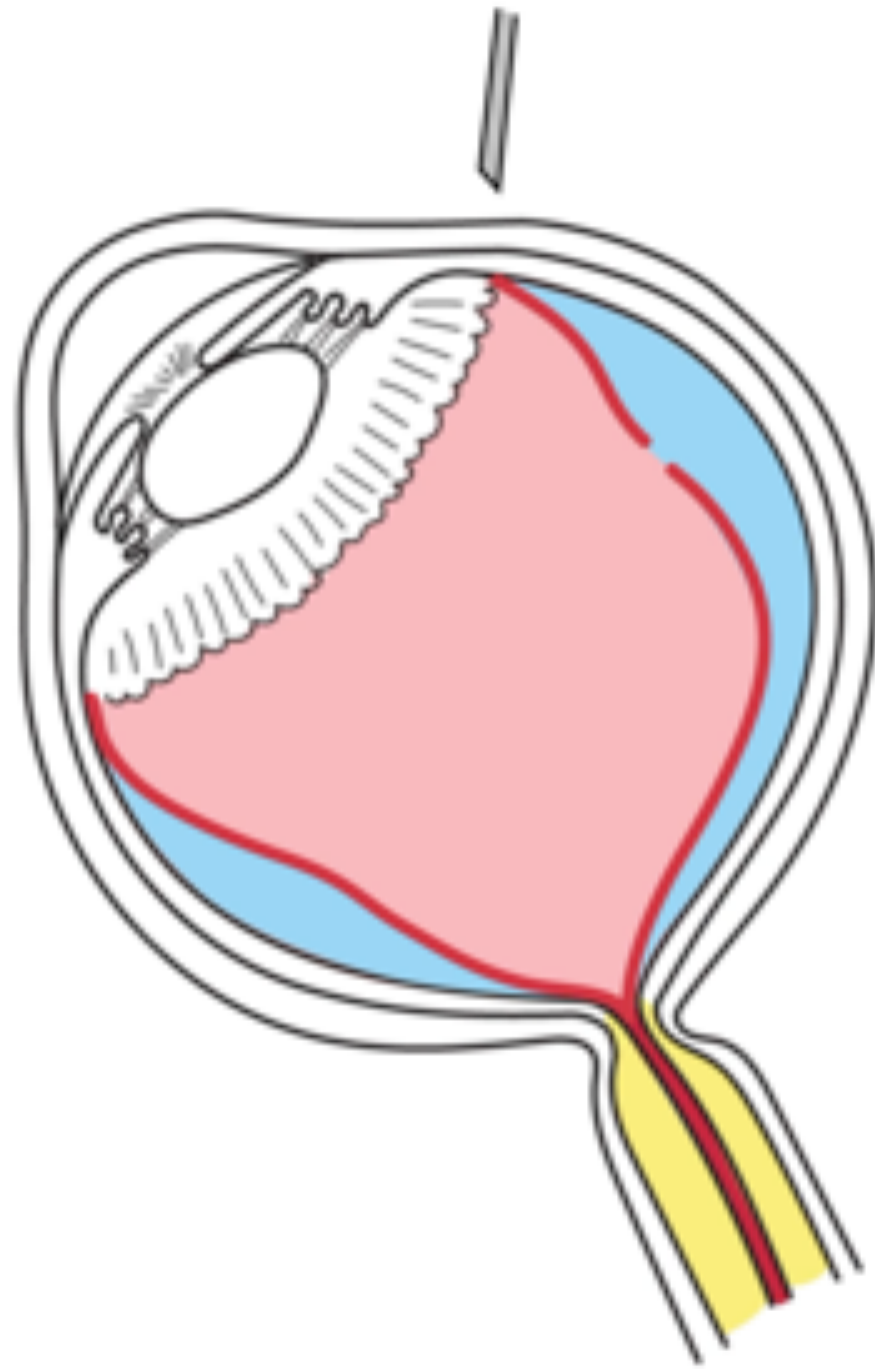
RESULTS Of the 238 patients included in the study, 144 were men (60.5%) and 94 were women (39.5%); mean (SD) age was 62.0 (11.0) years. Of the 238 eyes included in this study, 114 underwent PR (47.9%) and 124 underwent PPV (52.1%) as the final procedure to achieve reattachment. Median time from surgical procedure to fundus autofluorescence imaging was 3 months (interquartile range, 1-5 months). Baseline characteristics in both groups were similar. The proportion of eyes with retinal vessel printing on fundus autofluorescence was 7.0% for PR (8 of 114) and 44.4% for PPV (55 of 124) (37.4% difference; 95% CI, 27.4%-47.3%; $P < .001$). Analysis based on the initial procedure found that 42.4% (42 of 99) of the eyes in the PPV group vs 15.1% (21 of 139) of the eyes in the PR group (including 13 PR failures with subsequent PPV) had displacement (27.3% difference; 95% CI, 15.9%-38.7%; $P < .001$). Among eyes with displacement in the macula, the mean (SD) displacement was 0.137 (0.086)

INTEGRITY Study: Retinal displacement

RVP among PnR successes vs PPV successes

- PnR successes: **7.0% (8/114)**
- PPV successes: **44.4% (55/124)**

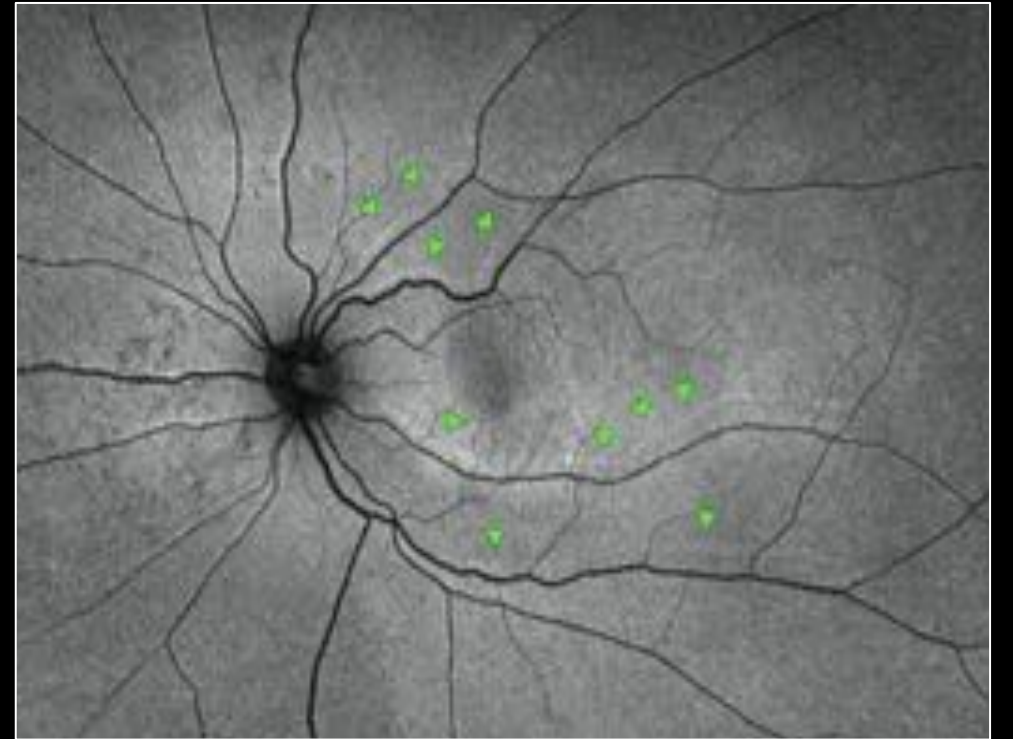
*p < 0.0001



Prospective Data?

PURPOSE

1. To compare **retinal displacement following pneumatic retinopexy (PnR) vs pars plana vitrectomy (PPV)**
2. Secondary objective: to determine whether retinal displacement is associated with postoperative BCVA, metamorphopsia and aniseikonia.



METHODS

- Multicenter prospective cohort study
 - St Michael's Hospital (Canada)
 - Newcastle Eye Centre (UK)
 - Hamilton Regional Eye Institute (Canada)
- Population: patients with **primary macula-off RRD** undergoing pneumatic retinopexy (PnR) or pars plana vitrectomy (PPV).
 - PnR: steam-rolling maneuver
 - PPV: immediate face-down position



METHODS

- FAF images were evaluated for the presence of RVP at 3 months post-op by 2 masked graders
- Metamorphopsia (M-CHARTS, Inami & Co Ltd)
- Aniseikonia (Awaya New Aniseikonia Tests, Handaya Co Ltd)



RESULTS

BASELINE CHARACTERISTICS

Table 1. Baseline characteristics of 157 patients

		Pneumatic Retinopexy (83 eyes)	Pars Plana Vitrectomy (74 eyes)	<i>P value</i>
		N, %	N, %	
<i>Age mean (SD), y</i>		61.91 ± 9.61	62.14 ± 9.48	0.718 ^b
<i>Gender</i>	Male	60 (72.3)	58 (78.14)	0.378 ^a
	Female	23 (27.77)	16 (21.60)	
<i>BCVA (logMar)</i>		1.59 ± 0.74	1.49 ± 0.79	0.589 ^b
<i>Lens status</i>	Pseudophakic	32 (38.60)	38 (51.40)	0.136 ^a
	Phakic	51 (61.40)	35 (47.30)	
	Aphakic	0	1 (1.40)	
<i>Area of detachment</i>	≤ 2 quadrants	57 (68.70%)	43(58.10%)	0.169 ^a
	> quadrants	26 (31.30%)	31 (41.90%)	

BCVA = best-corrected visual acuity | ^a Chi-square tests | ^b Mann-Whitney U

PRIMARY OUTCOME: INTENTION TO TREAT

Table 2. Presence of retinal displacement comparison between eyes following Pneumatic Retinopexy vs. Pars Plana Vitrectomy for rhegmatogenous retinal detachment repair.

	<i>Pneumatic Retinopexy</i> (83 eyes)	<i>Pars Plana Vitrectomy</i> (74 eyes)	<i>P value</i>
<i>Primary success</i>	68 (81.90)	69 (93.20%)	0.034 ^a
<i>Retinal displacement</i>	21 (25.30%)	37 (50%)	0.001 ^a
<i>Zone 1 displacement</i>	15 (18.1%)	31 (43.7%)	0.001 ^a

^a Chi-square tests

Zone 1: defined as a circle that had the fovea as its centre and the fovea-disc distance as its radius

FUNCTIONAL OUTCOMES: INTENTION TO TREAT

Table 3. Functional outcomes comparison between eyes following Pneumatic Retinopexy vs. Pars Plana Vitrectomy for rhegmatogenous retinal detachment repair.

	<i>Pneumatic Retinopexy</i> (83 eyes)	<i>Pars Plana Vitrectomy</i> (74 eyes)	<i>P</i>
<i>Follow-up time, d</i>	99.50 ± 59.97	112.06 ± 71.00	0.418 ^b
<i>BCVA logMAR</i>	0.41 ± 0.44	0.54 ± 0.47	0.020 ^b
<i>Vertical MChat</i>	0.33 ± 0.32	0.37 ± 0.40	0.521 ^c
<i>Horizontal MChart</i>	0.34 ± 0.31	0.30 ± 0.33	0.435 ^c
<i>Aniseikonia test</i>	2.46 ± 4.09	3.95 ± 5.33	0.067 ^c

BCVA = best-corrected visual acuity | ^a Chi-square tests | ^b Mann-Whitney U | ^c T-test

FUNCTIONAL OUTCOMES: SUCCESSFUL PnR vs PPV

Table 4. Functional outcomes comparison in eyes with primary success following Pneumatic Retinopexy vs. Pars Plana Vitrectomy for rhegmatogenous retinal detachment repair.

	<i>Pneumatic Retinopexy</i> (68 eyes)	<i>Pars Plana Vitrectomy</i> (69 eyes)	<i>P</i>
<i>BCVA logMAR</i>	0.33 ± 0.33	0.49 ± 0.44	0.019 ^c
<i>Vertical MChat</i>	0.33 ± 0.33	0.37 ± 0.41	0.564 ^c
<i>Horizontal MChart</i>	0.34 ± 0.33	0.31 ± 0.33	0.665 ^c
<i>Aniseikonia</i>	2.03 ± 3.77	4.22 ± 5.45	0.011 ^c

BCVA = best-corrected visual acuity | ^a Chi-square tests | ^b Mann-Whitney U | ^c T-test

FUNCTIONAL OUTCOMES: DISPLACED vs. NON-DISPLACED

Table 6. Functional outcomes comparison in eyes with Retinal Displacement vs. No-retinal Displacement.

	<i>Retinal Displacement (58 eyes)</i>	<i>No-retinal displacement (99 eyes)</i>	<i>P Value²</i>
<i>BCVA logMAR</i>	0.50 ± 0.53	0.45 ± 0.41	0.529
<i>Vertical MChat</i>	0.31 ± 0.32	0.38 ± 0.38	0.291
<i>Horizontal MChart</i>	0.29 ± 0.28	0.33 ± 0.34	0.456
<i>Aniseikonia</i>	4.52 ± 6.05	2.31 ± 3.51	0.017

BCVA = best-corrected visual acuity | ² T-test

Surgical techniques for Pars Plana Vitrectomy (PPV)

	<i>PPV = 74</i>	<i>RVP+</i>	<i>RVP-</i>	<i>P value^a</i>
Gauge, 23	49 (66.21)	23 (46.90)	26 (53.10)	0.416
25	25 (33.78)	14 (56)	11 (44)	
Phaco, Yes	0	0	0	.
No	74	37 (50)	37 (50)	
Cryo, Yes	35	16 (45.7)	19 (54.3)	0.485
No	39	21 (53.8)	18 (46.2)	
Laser, Yes	53	27 (50.9)	26 (49.1)	0.797
No	21	10 (47.6)	11 (52.4)	
PFO, Yes	12	5 (41.7)	7 (58.3)	0.528
No	62	32 (51.60)	30 (48.4)	
Post. retinotomy, Yes	20	8 (40)	12 (60)	0.295
No	54	29 (53.7)	25 (46.3)	
Tamponade, SF6	13	6 (46.2)	7 (53.8)	0.417
C3F8	42	20 (47.6)	22 (52.4)	
C2F6	15	10 (66.7)	5 (33.3)	
Silicone Oil	4	1 (25)	3 (75.0)	

RVP = Retinal vessel print | ^a Chi-square tests

CONCLUSIONS

- PnR is associated with less retinal displacement compared to PPV
- Successful PnR is associated with less aniseikonia compared to successful PPV
- Recognition of importance of retinal displacement may lead to refinements in surgical techniques with potentially improved functional outcomes



WALLPAPER ANALOGY FOR RETINAL DETACHMENT



LIRA vs HIRA



Thanks!

