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# Refractive Changes Following Scleral Buckle Surgery for Rhegmatogenous Retinal Detachment Based on Type of Implant Used

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No Financial Disclosures

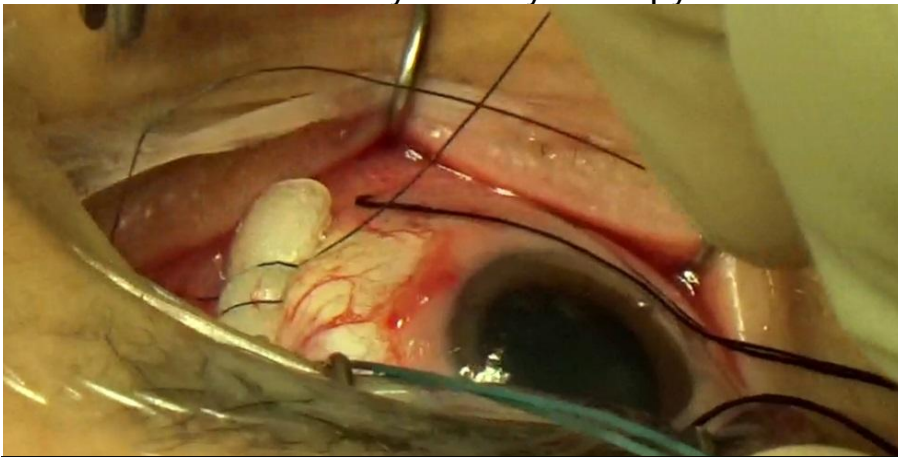
# Background

- Scleral buckling surgery has been used in management of rhegmatogenous retinal detachment (RRD) since the 1950's<sup>1</sup>
- The technique has a reattachment rate of 94%<sup>2</sup>
  - vs. Pars plana vitrectomy 92%<sup>2</sup> and pneumatic retinopexy 64%<sup>2</sup>
- Scleral buckling surgery has decreased in use as vitrectomy is more comfortable post-operatively, and pneumatic retinopexy has become more popular
- The significant refractive changes<sup>3,4</sup> following scleral buckle surgery also play a role in the decreased use
  - These changes are thought to arise for axial length changes, astigmatism induction and high order aberrations<sup>3,5,6</sup>
- Vitrectomy may not be ideal in some patients due to the increased risk of cataract formation such as young phakic patients
- Pneumatic retinopexy may not be optimal in inferior detachments or difficulty with compliance<sup>7</sup>



# Background

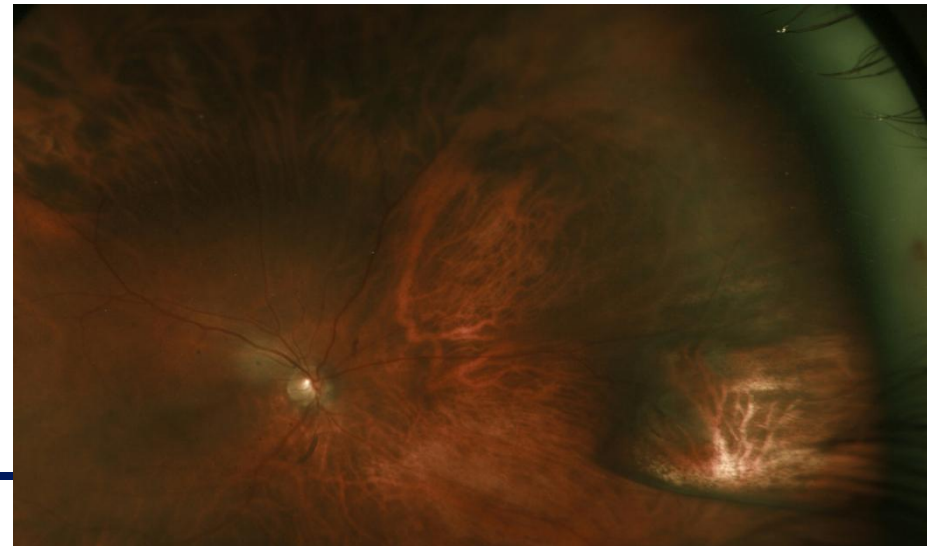
- Scleral buckle surgery
  - Localized indentation of the sclera, choroid, and pigment epithelium beneath a retinal break
  - Reduction of vitreoretinal traction by displacing the eye wall and retina centrally
  - seal retinal break
    - usually with cryotherapy



**segmental buckle:** intraoperative photo of a silicone sponge affixed to sclera with 5-0 nylon suture.



**encircling buckle:** post operative photo of an encircling scleral buckle in a 34 year old myopic patient



**radial buckle:** post operative photo of a 61 year old patient with nasal retinal detachment

# Purpose

- To evaluate refractive changes after scleral buckle surgery for rhegmatogenous retinal detachment, and compare outcomes of radial, segmental and encircling scleral buckle techniques.



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# Study Design

- Retrospective chart review of patients undergoing rhegmatogenous retinal detachment (RRD) treated with primary scleral buckle (SB) by nine different surgeons at Columbia University Medical Center.
- Pre-operative and post-operative refraction, pre-operative and post-operative best corrected visual acuity (BCVA), and re-operation rates were recorded.
- Configuration of retinal detachment and type of element used was also compared.
- Change in spherical equivalent (SE change) was compared between patients undergoing radial, segmental and encircling scleral buckle surgery.



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# Demographics

- A total of 47 eyes were reviewed.

Demographics	Total n= 47	Radial SB n= 9	Segmental SB n= 20	Encircling SB n= 18
Male	29 (62%)	5 (56 %)	14 ( 70%)	11 (61%)
Female	18 (38%)	4 (44%)	6 (30%)	7 (39%)
OD	27 (57%)	4 (44%)	12 (60%)	11 (61%)
OS	20 (43%)	5 (56%)	8 (40%)	7 (39%)
Macula on RRD	33 (70%)	7 (78 %)	14 ( 70%)	11 (61%)
Macula off RRD	14 (30%)	2 (12%)	6 (30%)	7 (39%)
Avg. Age (years)	48.19	56.02	52.12	39.83



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# Results

## Post-op Spherical Equivalent Mean Change



t-test	P value
SE avg change radial vs encircling	0.0003
SE avg change segmental vs encircling	<0.0001
avg change radial vs segmental	0.66



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# Results

- There was a greater myopic shift in encircling scleral buckle repair of RRD (mean pre-operative to post-operative SE change of -3.05D) when compared to segmental (SE change -0.42D  $p < 0.001$ ) and radial (SE change -0.19D  $p = 0.0003$ ) scleral buckle repair.
- No significant difference was noted between segmental and radial scleral buckles ( $p = 0.66$ ).
- There was no significant difference between the 3 groups in terms of pre-operative BCVA, post-operative BCVA and reoperation rates (all  $p$ -values  $> 0.1$ )
- The overall success rate was 89% with primary scleral buckle repair. The most common surgical complication was epiretinal membrane (4%)





# Conclusion

- Scleral buckle surgery remains an effective way to treat rhegmatogenous retinal detachments.
- Radial and segmental techniques of scleral buckle demonstrated significantly less refractive changes than encircling buckles, with no differences in post-operative BCVA or retinal attachment status.
- A radial or encircling buckle may be the best choice in a patient with high refractive demands such as those who are post-refractive surgery or with a multi focal IOL
- Patients who wish to preserve accommodation or those who must travel or cannot position may also benefit from this technique.



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