

Chandelier-Assisted Scleral Buckling

Can a new approach save the scleral buckle from extinction?

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Since its introduction in the 1950s,^{1,2} scleral buckling has been a highly successful technique for the repair of rhegmatogenous retinal detachment. However, the popularity of this time-proven treatment appears to be waning (see “The Dying Art of the Scleral Buckle” on the next page).³

The decreased practice of scleral buckling may be due in part to recent advances in the machines, instrumentation, and visualization systems for pars plana vitrectomy (PPV), making PPV a more attractive procedure for vitreoretinal specialists. In addition, the inability of learners to observe their mentors employing intraoperative indirect ophthalmoscopy in scleral buckling poses an additional challenge that may limit its transfer to the next generation of retina fellows.

Despite these issues, scleral buckling is the preferred treatment modality for many indications. This surgical approach entails lower costs than PPV and avoids many of the potential complications and postoperative requirements associated with PPV.^{4,5} Scleral buckling also preserves the vitreous, which can be beneficial in the event that intravitreal injections, now commonly used to treat numerous retinal diseases, are needed in the future.

CHANDELIER-ASSISTED SCLERAL BUCKLE

The recent introduction of chandelier endoillumination during scleral buckling capitalizes on advances in visualization technology afforded by widefield intraoperative viewing systems through the operating microscope. This addition may be pivotal in reversing the trend of diminishing surgical preference for scleral buckling.

Aras et al described the first transscleral fiberoptic-assisted scleral buckle, which consisted of a conventional scleral buckling surgery performed along with visualization and treatment of retinal breaks under an operating microscope using a torpedo-style light source inserted through a noncannulated sclerotomy.⁶ Nam et al introduced the more commonly used technique, in which a small-gauge fiberoptic chandelier light source

is inserted through a standard transscleral cannula.⁷ Since then, promising but limited data from around the world regarding the use of this technique and patient outcomes have been published.⁸⁻¹¹

THE TECHNIQUE

Our preferred method of chandelier-assisted scleral buckling surgery begins with a conventional 360° conjunctival peritomy followed by isolation and looping of the rectus muscles. At every step of the procedure, visualization is done through the microscope instead of by indirect ophthalmoscopy.

A transscleral cannula is placed to house the chandelier fiberoptic illumination system. Upon insertion of the chandelier light source, we use the operating microscope with either a widefield contact lens or a noncontact wide-angle visualization system for scleral-depressed examination and treatment of retinal breaks by cryotherapy.

The primary retinal break is marked to determine the location for buckle placement, at which point the chandelier

At a Glance

- Scleral buckling has been a successful technique used to repair rhegmatogenous retinal detachment since it was first introduced in the 1950s and is the preferred treatment modality for many indications.
- The use of a chandelier endoillumination system improves visualization and treatment of retinal breaks during scleral buckling surgery and may restore favor for the technique.
- Chandelier-assisted buckling may also limit or completely eliminate the need for indirect ophthalmoscopy, which in turn may lessen the prevalence of related musculoskeletal injuries among retina specialists.

THE DYING ART OF THE SCLERAL BUCKLE

By S.K. Steven Houston III, MD

Retina fellows at Wills Eye Hospital in Philadelphia perform an impressive number of surgeries during their 2-year program. As a 2015 graduate of the retina fellowship at Wills, I had the privilege of performing more than 1100 cases.

However, in fellowships across the country, the scleral buckle has become something of an endangered species. As many retina mentors have made clear, the number of new trainees comfortable with performing scleral buckles has fallen. The fewer fellows trained in scleral buckling, the less likely it is that patients whose conditions require the procedure will benefit from this specific surgical intervention. Indeed, even in my fellowship program (a highly rated program that performs a high volume of surgical procedures), only approximately 12.7% of the procedures I performed involved a scleral buckle.

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Total number of cases
during fellowship

1145

45

Number of primary buckle
cases without vitrectomy

Number of combined
buckle/vitrectomy cases

100

12.7%

Percentage of cases
with a buckle

light is removed and the cannula is plugged. This allows easier placement of the buckle around the globe without hindrance by the chandelier light source. The buckle is then sutured in place without the need of the microscope, except in highly myopic patients or those with very thin sclera for whom suturing under the microscope may be safer.

After pulling on the buckle, the chandelier is reintroduced through the cannula for visualization of pulsations at the disc, performance of additional cryotherapy, and assessment of the relation of the retinal breaks to the supporting buckle. Drainage is also done under direct visualization when needed. Microscope-integrated optical

coherence tomography can be used at this step to visualize the needle in the subretinal space for safer drainage.

ADVANTAGES OF THE CHANDELIER

The use of a chandelier endoillumination system improves visualization and treatment of retinal breaks during scleral buckling surgery. The combination of a wide-angle viewing lens with diffuse endoillumination provides excellent visualization of retinal breaks, even in the far periphery, ensuring accurate identification and precise cryotherapy of all breaks. Missed breaks are common causes of recurrent detachment for less experienced surgeons and trainees. This technique ensures treatment of all breaks while avoiding excessive or more posterior treatment.

This approach also improves teaching of the procedure. By permitting the use of the operating microscope and live video feed, this technique enables the demonstration of cryopexy for trainees and allows direct observation and guidance of treatment performed by trainees.

In addition, the ability for all surgical team members to simultaneously view all aspects of the operation appears to improve communication among the team members. This enhances efficiency, precluding the need to continually switch the indirect ophthalmoscope between faculty and trainees. This, combined with the benefit of better overall visualization through the cornea, potentially shortens the duration of the procedure.

Finally, by limiting or completely obviating the need for indirect ophthalmoscopy, the use of chandelier-assisted scleral buckling may help to reduce related musculoskeletal injuries, which are prevalent among retina specialists.¹² In our experience to date at Duke University Eye Center, the use of a chandelier light source has not been associated with increased surgical time, iatrogenic retinal breaks, or other complications.

ADDITIONAL SURGICAL PEARLS

- We usually place our lighting system 180° away from the retinal breaks in pseudophakic patients for maximal illumination when indenting the light. However, we place the chandelier 90° away in phakic patients to avoid lens touch.
- Mild vitreous prolapse through the transscleral cannula is a unique risk of the chandelier scleral buckle, particularly when pulling up the buckle or injecting gas into the posterior chamber. To prevent this, it is necessary to plug the transscleral cannula when it is not occupied by the chandelier. We found the plug included with the Alcon 20-to-25-gauge adaptor satisfactory when using a 25-gauge Alcon

nonvalved cannula. To further curtail the risk of vitreous extrusion, intraocular pressure can be reduced with creation of an anterior chamber paracentesis before removal of the chandelier light system. Be sure to cut any vitreous wick that presents through the cannula or after cannula removal with scissors.

- The sclerotomy site should be sutured after cannula removal.

CONCLUSION

Wide-angle visualization with chandelier endoillumination is a novel advancement that appears to bring a distinct advantage to the performance and teaching of scleral buckling. For appropriate patients, chandelier-assisted scleral buckling appears to provide several potential advantages over traditional buckling techniques. ■

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