Vitreoretinal Surgery Online

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Vitreoretinal Surgery Online
A Leading Retina Textbook Comes to Life—for Free

Retina Times recently had the opportunity to stroll through the pages of vrsurgeryonline.com, the brainchild of Professor Adrian Fung of Sydney, Australia. The website is a tour de force in vitreoretinal surgery, complete with easy-to-follow, lucid explanations and a panoply of surgical videos.

RT spoke with Dr. Fung and his senior editors, Drs. Nico Yannuzzi and Sebastian Waldstein, to learn more about this new, free educational resource now available to the retina community.

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Joel Pearlman: I see that vrsurgeryonline.com is based on an earlier textbook, *Vitreoretinal Surgery for Trainees*. Can you please tell us the origins of that book?

Adrian Fung: In 2010, I was a vitreoretinal fellow at the University of British Columbia in Vancouver, Canada. I remember asking my supervisors in the first week of fellowship what textbooks I should read to help me prepare for the operating room (OR). They gave me some names of textbooks, but I remember being underwhelmed by them.

The books were useful in explaining disease processes and the available surgical options, but they didn't place me in the perspective of the surgeon performing an operation for the first time. I wanted a textbook that could help anyone—even someone who had never done a vitrectomy—to know a step-by-step process to proceed: how to set up the pedals, how to insert the sclerostomy trocars, and how to check the infusion line.

I spent my fellowship year writing notes on what I was learning in the OR and collecting photos for my first textbook, *Vitreoretinal Surgery for Trainees—The Sydney Eye Hospital and University of British Columbia Manual*, which was published in print in 2012. This book was unique because of its "cookbook" style, enabling surgeons to understand how to complete an operation they had never performed before.

Joel Pearlman: So how did vrsurgeryonline.com come about? The website, while a polished and professional product, looks like a labor of love. Can you tell us about that?

Adrian Fung: Essentially, vrsurgeryonline.com is the second edition of *Vitreoretinal Surgery for Trainees*. Ten years is a very long time in the world of vitreoretinal surgery, and techniques evolve rapidly. We have moved to smaller-gauge vitrectomy with faster cut rates, improved machines, and new techniques.

It was important to keep up with recent advances and write a new contemporary textbook. In the online edition, all the chapters have been updated and revised. Over 20 new chapters have been added, including ones on digitally assisted vitrectomy, intraoperative optical coherence tomography, robotics, gene therapy, and stem cell therapy. There's even a chapter dedicated to clinical surgical trials and a library of 78 surgical videos.

For a textbook like this to have relevance, it needs to bring together perspectives from multiple surgeons. I was fortunate to have met Nico Yannuzzi, MD, in 2011 when I was working with his wonderful father, Larry Yannuzzi, MD. I think we wrote Nico's first-ever ophthalmic journal manuscript together in 2013, and we have kept in touch since then.

In 2019, I met Sebastian Waldstein, MD, PhD, who had come from Vienna, Austria, and was my fellow for the year at Westmead Hospital in Sydney, Australia, before becoming the youngest department chair in his country. I reached out to Nico (who was then already working at Bascom Palmer Eye Institute in Miami) and with Sebastian, we started work-

ing on this second edition, using the original textbook as the base.

I don't think any of us would have thought this "simple" project would take 3 years to complete—in fact, if we had known that, we probably wouldn't have started!

Joel Pearlman: What makes vrsurgeryonline.com different from other surgical textbooks?

Adrian Fung: I strongly believe there is more than one successful method of performing vitreoretinal surgery. Take, for instance, a rhegmatogenous retinal detachment. Multiple methods can be used to address this problem—a pneumatic retinopexy, a vitrectomy, a scleral buckle, or a combination of these techniques.

In some circumstances, one of these choices might be wrong, but often there is more than one "correct" choice. Unlike some other fields of ophthalmology, clinical trials in vitreoretinal surgery are limited. So, while we can teach our fellows the "science" of surgery, the "art" is harder: knowing when—and when *not*—to operate, which options are available, and the pros and cons of each choice. That's why vrsurgeryonline.com tries to avoid being dogmatic.

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>
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Each chapter provides multiple options on how to tackle a given problem. When repairing a retinal detachment, one can choose to drain from the break, use "heavy liquids" to assist, or create a posterior retinotomy. Every technique has advantages and disadvantages that need to be understood.

Joel Pearlman: How did you assemble your editorial team?

Adrian Fung: As mentioned, I met Nico in the United States and Sebastian during his time in Sydney. They became the senior editors. Kenneth Lee, MBBS, was my next fellow at Westmead Hospital, and he became the figure editor.

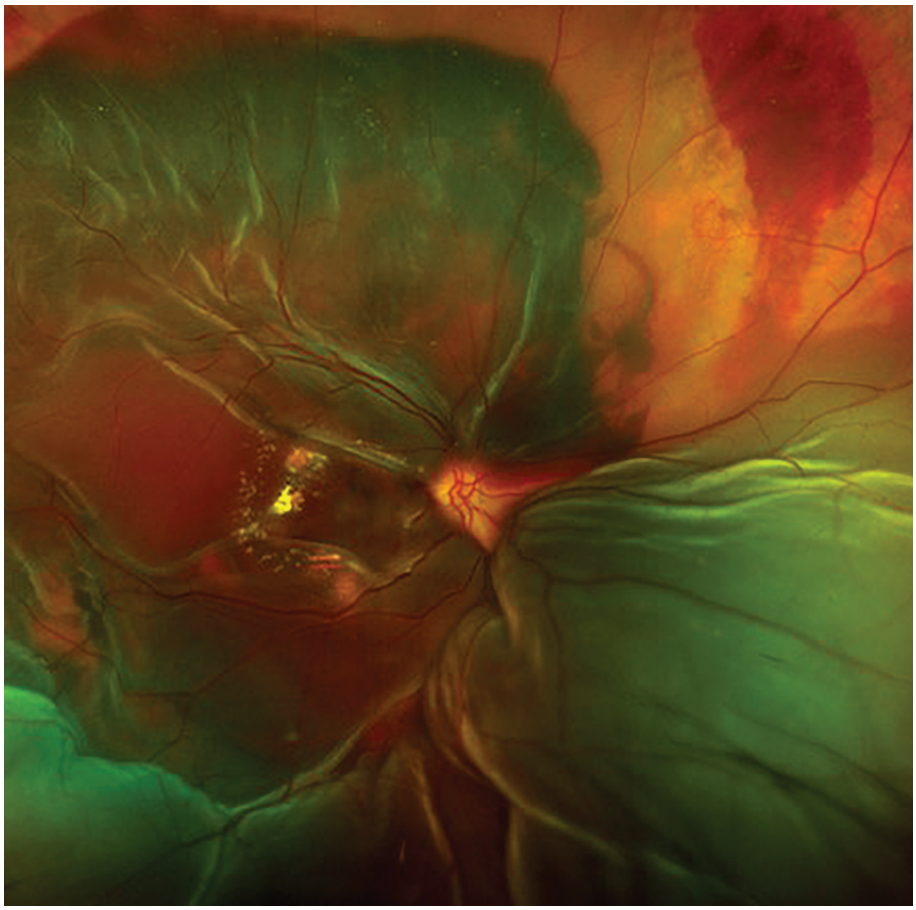

Figure 1. Massive subretinal hemorrhage in a 90-year-old Caucasian female. Vitrectomy with evacuation of the hemorrhage, subretinal tissue-plasminogen activator, and pneumatic displacement were performed. *Image courtesy Adrian T. Fung, MBBS, MMed (Ophth Sci), MMed (Clin Epi), FRANZCO.*

Nico had a good friend and co-fellow at Bascom Palmer, Nimesh Patel, MD, who now is an attending at Massachusetts Eye and Ear. Nimesh is a video-editing guru and became our video editor. Finally, Raymond Guan, MBBS, is an intern who did a research project with me while he was a medical student. He had worked with me on a previous textbook (westmeadeyemanual.com), so he was the perfect person to format the book before it was sent to the website developer.

Joel Pearlman: Why did you decide to publish on a website instead of a traditional textbook?

Nico Yannuzzi: It's rare to find an entire textbook online, but we believe this is the way of the future. There are several advantages over a physical textbook. First, very few ophthalmologists carry around large textbooks. An online resource can be accessed anywhere, even in the OR just before a case—this is exactly the aim of this website.

Second, the online format will allow us to continually update the resource with corrections and new chapter content. This is so important, given how quickly the field is changing. Finally, a digital medium allows us to include videos that would not have been possible in a physical textbook.

Joel Pearlman: Who is the resource aimed at? Fellows? Surgeons in their first few years? Old salts? Can this replace more traditional educational content?

Sebastian Waldstein: ~~Everyone!~~ Although the first edition, *Vitreoretinal Surgery for Trainees*, was predominantly targeted ~~at~~ fellows, this new edition has become so resource rich that we feel it would be beneficial to anyone involved in vitreoretinal surgery: surgeons of all levels, assistants, and scrub nurses.

Joel Pearlman: Your list of editors and authors reads like an international roster of All-Stars. How did you assemble and direct such a group?

Sebastian Waldstein: Yes, we're extremely humbled to have 93 authors, including some of the most famous vitreoretinal surgeons in the world. I think the power of our collaboration is that we all come from different regions:

Adrian has contacts in Australia and Canada where he trained, Nico and Nimesh have contacts in the United States, I have contacts in Europe and Kenneth in Asia. This was really important—surgical styles vary from country to country, and it was important to us that all techniques be described.

We tried to get as many fellow-attending pairings as possible from each academic institution. The fellow would be responsible for either rewriting an old chapter from the first edition or writing a chapter on a topic that hadn't been covered before. This would then be reviewed by the attending before being sent to us.

Joel Pearlman: What challenges did you face in writing the textbook?

Nico Yannuzzi: One of the biggest challenges was keeping the "tone" consistent. As mentioned, we wanted to keep the "cookbook" style of practical teaching. When writing a textbook with multiple authors, there's a risk that the end result becomes just a patchwork of their individual opinions, without a consistent style or format to the book.

When we contacted the authors, we explained what we were hoping to achieve, but even then it's a challenge to find the right balance between accepting individuality and maintaining a consistent tone. ~~Trying to manage~~ 93 authors is no easy task! Trying to get the editors together (across 4 time zones separated by 14 hours!) was difficult, but video calls made things easier.

Even now, when we read the text we often think "that could be improved" or "we should add this." But at some point, one needs to draw a line in the sand and publish. The textbook is not perfect, but we have the opportunity to continually improve it and we're very proud of what we've been able to achieve.

Joel Pearlman: Our field is quite dynamic, and while the core principles ~~persist,~~ the details change quickly. How do you handle updates?

Sebastian Waldstein: That is the beauty of an online textbook. The field of vitreoretinal surgery is advancing at a rapid pace—there are constant equipment upgrades and new techniques being described. Unlike many surgical textbooks, which are outdated even by the time they are published, an online textbook can be ~~constantly~~ updated.

The plan is to review the textbook every 6 months with our fellows. The editorial team will meet and review comments and suggestions made in the feedback form on the homepage. We have already had authors volunteer for new chapters, so we encourage anyone who is interested in contributing to contact us via the feedback form on the homepage. We may also commission new authors in the future as needed.

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Joel Pearlman: What advice would you give junior vitreoretinal surgeons?

Adrian Fung: I have many philosophies on vitreoretinal surgery. I've already mentioned the first: although there are wrong ways to approach a problem, there is often more than one right way, and the pros and cons of each need to be understood.

The second is that, if you distill vitreoretinal surgery to its core, it's all about visualization. As a surgeon, you should constantly ask yourself, "Why is the view poor?" or conversely, "How can I make the view better?" There can be multiple factors: the cornea might be dry, corneal edema may be developing because the intraocular pressure is too high, there might be a hyphema, a cataract might be developing, the intraocular lens might be fogging, there might be a vitreous hemorrhage from a retinal vessel that requires diathermy, etc.

The corollary is that you should do what you can when there is still a view. When operating on a diabetic patient, perform peripheral panretinal endolaser photocoagulation before

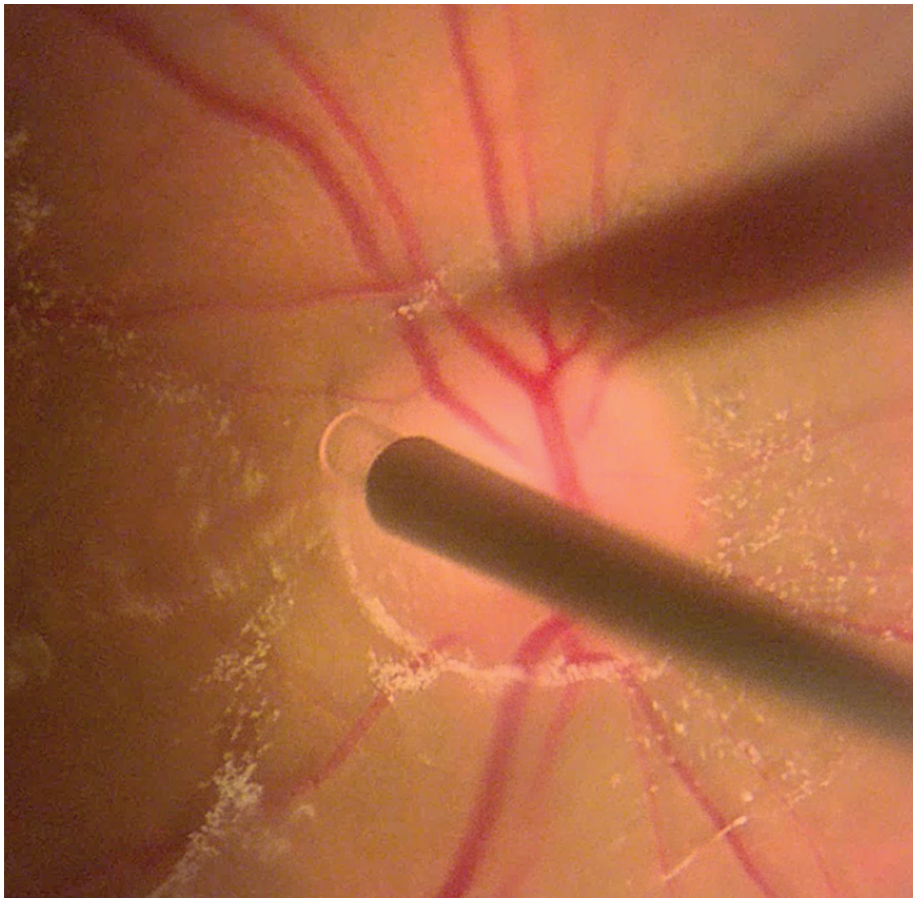

Figure 2. Elevation of the posterior hyaloid off the optic nerve using intravitreal triamcinolone to assist with visualization. When the posterior vitreous detachment (PVD) is difficult to induce, a soft-tip extrusion cannula on maximal vacuum is a useful instrument to use, as it is gentle and allows for a perpendicular approach. Once an edge of the vitreous has been separated off the optic nerve, the PVD can be completed with the vitrectomy cutter. *Image courtesy Adrian T. Fung, MBBS, MMed (Ophth Sci), MMed (Clin Epi), FRANZCO.*

attempting complex posterior membrane peels, where there is the risk of hemorrhage and worsening of the view.

The third philosophy is to have a clear surgical goal and think through it preoperatively. What steps am I planning to perform to achieve this goal? What is my Plan B if there are intraoperative complications?

The fourth is to do the minimum required to achieve your surgical goal. The retina is unforgiving, and things can go wrong intraoperatively. As Voltaire said, "Perfection is the enemy of good." Sometimes peeling that extra little bit of internal limiting membrane outside the macula won't improve the patient's outcome, but does risk a retinal tear and hemorrhage.

The fifth philosophy is to learn to use the operating team to the fullest. The scrub and scout nurse and anesthetist can make or break a case. Learn their names; be nice to them and they will work hard for you. Communicate what equipment you need at the start of the case and request these 1 to 2 steps ahead so there is minimal waiting time wasted for them

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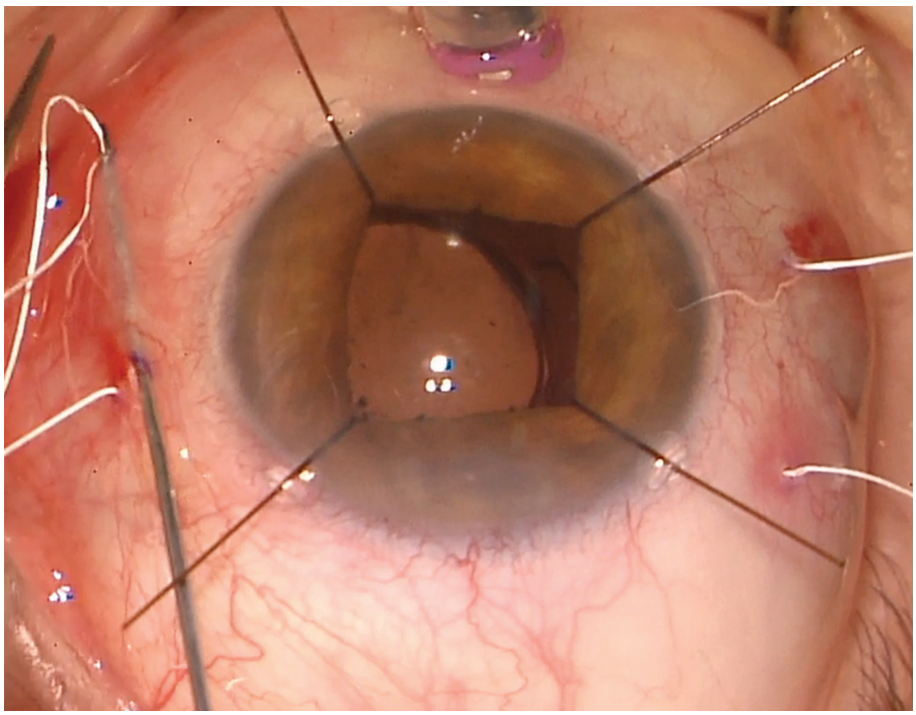

Figure 3. Four-point fixation scleral suturing of an Akreos AO60 (Bausch+Lomb) intraocular lens using CV-8 GORE-TEX suture (W.L. Gore & Associates). The suture can be retrieved through a subconjunctival tunnel without having to open the conjunctiva. ***Image courtesy Adrian T. Fung, MBBS, MMed (Ophth Sci), MMed (Clin Epi), FRANZCO.***

rates remained significantly different between groups when accounting for the use of scleral buckle or silicone oil with PPV.

Application to Practice: This study found that PPV is associated with higher rates of retinal displacement and aniseikonia compared with PnR.

Hypercoagulability Testing and Hypercoagulable Disorders in Young Central Retinal Vein Occlusion Patients

Tauqeer Z, Bracha P, McGeehan B, VanderBeek BL. *Ophthalmol Retina*. 2022;6(1):37-42. doi:10.1016/j.oret.2021.03.009

Patients younger than 50 years old are unlikely to develop a central retinal vein occlusion (CRVO). When it does happen, there is often uncertainty about whether further workup is needed, and if so, what testing is necessary. In this study, a national claims database was used to identify 1181 patients younger than 50 years old with a newly diagnosed CRVO. Main outcome measures were workup for hypercoagulable states within 90 days of CRVO, and a diagnosis of a hypercoagulable state within 1 year of CRVO diagnosis.

Hypercoagulable states included factor V Leiden, homocysteinemia, protein C or S deficiency, antiphospholipid antibody syndrome, lupus anticoagulant, anticardiolipin antibodies, antithrombin III deficiency, venous embolus-thrombosis, pulmonary emboli, polycythemia vera, essential thrombocytosis, paroxysmal nocturnal hemoglobinuria, nephrotic syndrome, and cancer.

Only 38.1% of patients had testing within 90 days of diagnosis, and 11.5% were diagnosed with a hypercoagulable state within 1 year after CRVO diagnosis—much higher than the 0.1% in the general population. Traditional risk factors (diabetes, hypertension, or hyperlipidemia) were present in 52.5% of patients. The rate of finding an additional hypercoagulable state in patients with these risk factors and without was similar ($P > .166$).

Application to Clinical Practice: In patients younger than 50 years old with a CRVO, testing for hypercoagulable states can lead to life-saving diagnoses.

Financial Disclosures

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to provide you with an instrument. Listen to them if they notice something that hasn't caught your attention.

The sixth is to remember that the patient is the most important person in the room. We are used to performing hundreds of operations each year, but this may be the only eye operation a patient will have in his or her life. Many will hear every word we say during surgery, so we need to avoid talking about the latest movie or saying things like "oops" if a mistake occurs. If an operation goes well, make sure you tell the patient immediately once surgery has been completed—this is greatly reassuring. If it does not go so well, tell the patient something positive about the surgery, but explain that there were challenges that you will explain in more detail once the sedation has worn off.

Finally, be kind to yourself as a surgeon. We are all only as good as our last surgery, and even the best surgeons have off days and complications. We need to accept this as part of our vocation, learn from our mistakes, but not get so down that it affects our confidence for future surgery or home life. Speaking to colleagues about challenging cases is always beneficial.

Joel Pearlman: Tell us about your decision to make vrsurgeryonline free.

Adrian Fung: We hope that vrsurgeryonline.com can be useful for any vitreoretinal surgeon in the world. I have worked in hospitals in several developing countries, and know how useful a free, open-access resource like this can be for some surgeons. The textbook has been free of any sponsorship or industry influence; this is important for a non-biased perspective.

Joel Pearlman: What are your plans for vrsurgeryonline? An app? A virtual reality game? Podcasts? (I saw Jay Sridhar in the list of editors, so the podcasts are probably done already.)

Nico Yannuzzi: There has been feedback that some people would like to have an offline-accessible digital app, so we are looking into whether this is feasible. We would love for everyone to spread the word and hope to feature vrsurgeryonline on Jay's podcast, *Straight From the Cutter's Mouth*, soon.

Joel Pearlman: Who would you like to thank?

Adrian Fung: So many people have contributed to this project. The editorial team has been fantastic. A 3-year project is no small task, but everyone remained enthusiastic and dedicated to the task. This resource couldn't have been written without the generosity of the authors, who volunteered their time and expertise.

This is the largest collaboration of its type I have even been involved in. On the homepage is a list of institutions that have supported us. I'd like to include *Retina Times* on that list! I'd also like to thank my past mentors, fellows, and patients who have taught, and continue to teach me. Finally, I am eternally grateful to my beautiful wife, Cynthia and 2 gorgeous daughters, Aria and Elodie, who put up with my late-night meetings and allowed me to pursue my passion in the field of retina.

Joel Pearlman: What kind of feedback would you like to see? How can readers reach you?

Adrian Fung: The best compliment we can receive is if this textbook becomes the "go to" resource for all vitreoretinal surgeons in the world. Please share this resource with your colleagues so it becomes more widely known and subscribe for updates (see the bottom of the homepage). We would love to hear feedback from readers of the website—corrections, suggestions, and volunteers for new chapters are welcome. The best way to contact us is via the feedback form at the bottom of the homepage. This way, we will have a record of everyone who contacts us, and we will (eventually!) get back to you.

Visit www.vrsurgeryonline.com

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