

سلام

خواندن نمونه‌های موفق و یادگیری و الگوبرداری، روش‌هایی تأیید شده برای رشد فردی و سازمانی هستند. در این شماره مصاحبه کامل با یک چشم‌پزشک نوآور به نام استیوچارلز را می‌خوانیم. مرور دیدگاه‌های ایشان نشان می‌دهد که چقدر نوآوری سهل و ممتنع؛ دردسترس است اما سبک زندگی‌ای متفاوت می‌خواهد و پشتکار...

سر دبیر

Innovation in Ophthalmology: What Drives It, What Holds It Back?

By Steve Charles, MD, FACS, FICS | May 2012

In ophthalmology, Change is continuous. Cataract surgery, Refractive surgery, vitreoretinal surgery, And the treatment of AMD have all been transformed in the last few decades. Behind these changes are a handful of individuals who have created and developed the technologies and the molecules that have enabled better patient care. To find out what supports and what threatens this stream of new technology we spoke to one of the most innovative figures in the field, Steven Charles, MD. In addition to being a high-volume vitreoretinal surgeon, Dr Charles is an engineer and has developed some of the most important new technologies in ophthalmology and other fields.



- Steve Charles .MD from the Bascom Palmer Eye Institute at the University of Miami School of Medicine
- Bachelor's degree in Engineering
- Ophthalmologist and vitreoretinal surgeon
- Clinical Professor at the University of Tennessee
- Adjunct Professor at Columbia College of Physicians and Surgeons.



آفاق

ماهنامه قطب علمی چشم پزشکی فارابی
توسعه و چشم اندازهای سازمانی

توزیع: اعضای هیات علمی و کارشناسان ارشد و مسوولین واحدها

صاحب امتیاز: بیمارستان فارابی

مدیر مسئول: رئیس بیمارستان، دکتر محمود جباروند و

مدیر بیمارستان، دکتر هادی مخترع

سر دبیر: دکتر سیدفرزاد محمدی

دستیار سر دبیر: زهرا هاشمی (کارشناس نوآوری)

دبیر اجرایی: ایوب منتی

شمارگان: ۱۵۰ نسخه

استادان ارجمند و مسوولین محترم بیمارستان

همان‌گونه که پیش از این در دو نوبت دیگر هم گفته شد آفاق قالبی‌ست برای طرح و ترویج ایده‌ها، هم‌اندیشی و به اشتراک‌گذاردن برنامه‌ها و گزارشات تحلیلی در فارابی و هر یک از صاحب‌نظران و علاقمندان می‌توانند در این قالب ویژه‌نامه منتشر نمایند و عهده‌دار تدوین و ویراستاری آن شماره تحت نام خود باشند. نمونه‌ای از این کاربرد را در خردادماه ۱۳۹۲ در حوزه پژوهش داشتیم.

با تشکر
کارشناس نوآوری

Refractive Eyecare Ophthalmology seems like an unusually fertile field for invention. Is that true? If so, why?

Steven Charles, MD It is true, and there are a number of reasons. Ophthalmology is a broad field with multiple subspecialties and an array of challenges. As ophthalmologists, we treat both the ocular manifestations of systemic disease and purely ocular conditions like retinal detachment, cataract, or refractive error. Our work requires sophisticated technology, both diagnostic and surgical. And our interventions make use of traditional pharmaceutical, biopharmaceutical (like Lucentis®), and surgical tools.

From a human perspective, ophthalmology is an attractive field for young doctors, and it is able to draw some of the top talent from medical school. So we have a pool of smart, success-oriented people focused on a wide range of fairly well defined technological problems.

In addition, the market is large enough to reward investment, and venture capitalists (VCs) and big companies have been willing to pursue, develop, and support new ideas.

VC: Venture Capitalist

سرمایه‌گذار در یک پروژه تجاری‌سازی و یا راه‌اندازی یک کسب و کار که از یک سو با ریسک و از سوی دیگر با شانس رشد و سودآوری قابل توجه همراه است.



FIGURE 1:
The Author's most recent invention, the Constellation* Vision system (Alcon) enables small-gauge Vitreoretinal Surgery. (Image courtesy of Alcon)

Unique to ophthalmology is the fact that the eye is the only organ that is conducive to optical imaging, so we have tools like spectral domain OCT, angiography, confocal microscopy, adaptive optics, and auto-fluorescence.

Can you tell us a bit about your intertwined careers as an inventor/entrepreneur and ophthalmologist?

Entrepreneur:

کارآفرین: فردی که کسب و کاری جدید را با وجود ریسک راه‌اندازی می‌کند. این افراد تلاشگر، مسوولیت پذیر، اهل کار گروهی و صاحب ابتکار عمل هستند.

Charles I started out to be a mechanical and electrical engineer. I went into medicine because I wanted to develop medical devices and into ophthalmology in order to be a microsurgeon and teacher. My first invention was endophotocoagulation and my most recent was the Alcon Constellation® Vision System, of which I am the principal architect (Figure 1). In the process I have collected 105 patents (either received or applied for) and been the designer of instruments that have driven more than 3 billion\$ in sales. I've founded companies and sold them, most recently MicroDexterity Systems, a robotics company of which I was founder and chairman.

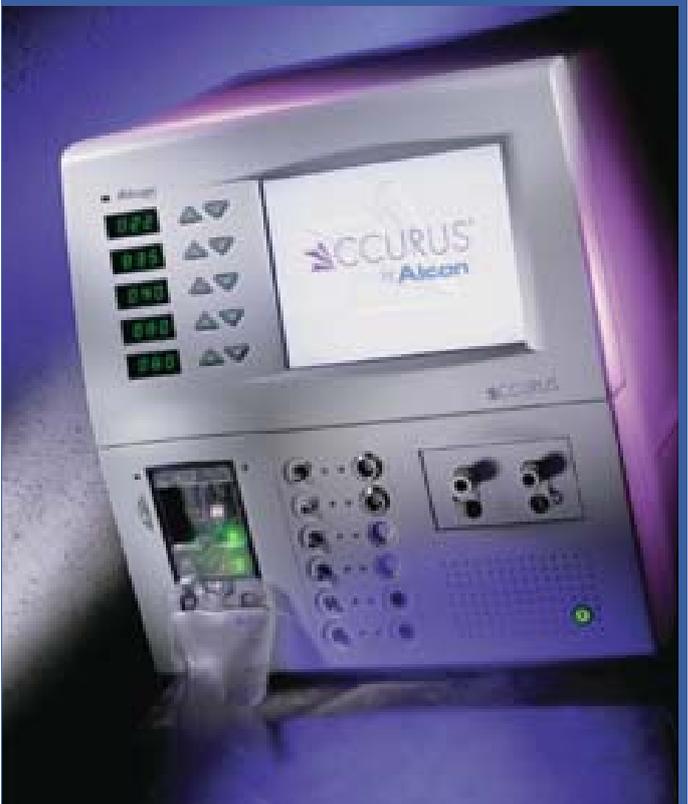


FIGURE 2:
The Accurus* Surgical System of which the author is a principal architect, facilitates combined cataract and vitrectomy procedures from a single user interface. (Image courtesy of Alcon)

What drives you to be a serial inventor? What are the rewards?

Charles Problem solving is both the driver and the reward. I have done 29,000 vitrectomies and see patients continuously. Surgical practice is the laboratory where I find problems that need solutions (Figure 2). The biggest reward is knowing that machines I developed are in operating rooms all around the world and that vitreoretinal surgeons worldwide use my technologies and techniques to help patients.

Lots of people—lots of physicians—want to be innovators. What does it take to actually be one?

Charles I recently sat next to a high-level consultant on an airplane, and in the course of our conversation he said something that applies here: “Hope is not a strategy.” In another context, pundits have described terrorists as being of two types: operational and aspirational. There are a lot of aspirational innovators—the old name for them was wannabes.

Wannabes: Want to be's

فردی که آرزو دارد نقش یا موقعیت خاصی را داشته باشد اما در عمل گام‌های ضروری را بر نمی‌دارد...
چه اصطلاح جالبی است و چقدر با تجارب شخصی ما تداعی می‌کند.

For everybody who makes a substantial contribution, there are 100 people who think they have, or think they will, or simply want to. But the desire to be an innovator or to start a company, by itself, accomplishes nothing. What works is to be actively engaged in clinical care so that you encounter real problems. You also need to be actively engaged in another technology that is applicable to healthcare. When I say actively engaged, I don't mean getting a degree in engineering 15 years ago; I mean maintaining true competence and staying up-to-date. In my case, in addition to being an active surgeon and clinician, I read 30 engineering magazines and maintain competency in mechanical and electrical engineering and design. That's what works.

You have founded multiple companies. How did you do that without an MBA or business background?

Charles I think it's often a big advantage not to have an MBA. When engineers, MDs, and PhD scientists get an MBA, they often become focused on business, and over time they can lose their technical competency. These people are frequently good managers, but they can make bad technology choices because they haven't maintained their technological competency. So the winners are people who roll up their sleeves and work 90 hours a week, who put in their own money, and maintain both clinical and technical competency.

So what is the secret of your success?

Charles The secret of my success? I have continuously done more surgery than anybody else for 37 years, and I have continued to do engineering for 37 years. And my patents are for devices that I have developed myself. I didn't scribble a few ideas and a rough sketch on a napkin and hand it to real engineers to figure out. I handed in the full CAD file with all the supporting materials.

CAD File: Computer-aided design

The core message is: put in your own time, your own money, and your own technical competency. And don't lose your clinical competency.

Are you saying that you need to do everything yourself?

Charles No. What I'm saying is that you have to work hard and have enough faith in your own abilities to back them with your own funds; but you can't do it all alone. Say you are a physician with a core problem, and you don't know what to do about it. Go out and research technical competencies and find people to work with. These people have to be good. If they are not team players, or they are poor managers, or they don't have the right work ethic, get new ones.

تهدیدی برای شرکتهای دانش بنیان در آینده

A lot of aspirational entrepreneurs form companies that are really little clubs—just three or four people. Highly secretive, they don't find out what other people are doing or discuss their ideas, and they insulate themselves from the real world because they believe that if they don't tell anybody about it, their product will burst upon the world and make them rich. And so they make stupid mistakes, because they think they know enough and don't have to look outside their small circle. The fact is, you never know enough; you have to keep learning.

You and others have identified the FDA as a barrier to innovation. Why is that?

Charles: People complain loudly about the FDA and, of course, they're right; but the FDA, like the Patent Office, has an almost impossible job. Both are presented with ideas or devices that have been worked on for 5 or 10 years, are extravagantly complicated and hopefully new—and they are supposed to understand them in 90 days and respond intelligently. They are paid less than the people who are submitting, and they have niche technical competencies, which may or may not be relevant to the work in front of them. And the volume they deal with is huge. So even though the FDA and the Patent Office are incredibly far behind and incredibly slow, I understand their plight.



While big companies and VCs have been critical to the development of new solutions, they often seem risk-averse and unwilling to commit to new things. Why is that?

Charles I often hear people say, “Those venture capitalists, they just don’t understand,” or “The big companies are hopelessly rigid and conservative.” While there is some truth to that, there are also reasons for it. The industry that surrounds ophthalmology has been around for a long time and is highly competitive. As always happens when competitive industries mature, there is consolidation down to a few major players. If you have been at one of the big companies long enough and have gotten high enough to be a decision maker, and you bet on something new and lose, you don’t have a job. And since there are only one or two other companies, there is nowhere to go. So, in short, the big companies are afraid of backing losers. Rather than risk failure, they would much prefer to pay top dollar to a start-up company that has taken the risk and demonstrated that a product can succeed.

Startup (Company):

کسب و کاری که در فاز راه اندازی است.
این فاز با ریسک و هزینه بالا همراه است.

استاد استیو چارلز نمونه‌ای از یک دانش‌پژوه بالینی است (Clinician-Scientist). این افراد اغلب زمینه‌های علمی چند جانبه دارند؛ ملاحظه نمودید ایشان مهندس بوده‌اند. از این رو توانایی ممتازی برای پژوهش‌های ترجمانی (Translational Research) یا تحقیقات آزمایشگاه به بالین دارند و به طور طبیعی در مسیر اختراع تحقیق و توسعه و نوآوری قرار می‌گیرند. اما این تنها راه نیست؛ تعادل و دادوستد بین رشته‌ای و تشکیل تیم‌های چندرشته‌ای و توسعه شراکت‌ها نیز در زنجیره نوآوری همین کارکرد را دارند.

VCs are a different story. What makes them conservative is the abysmal success rate: in medical devices it’s 3 in 10, and in biopharmaceuticals it’s 1 in 10. So they have to spend tens or hundreds of millions of dollars to get a single hit and watch a lot of failures along the way. With all the talent, money, and effort they put into it, that’s the best they can do. It just shows how hard it is. Understandably, it makes them conservative.

Elsewhere you have identified some other barriers to innovation. Could you explain what you mean by “the unintended consequences of conservative therapeutic strategies?”

Charles Let me give you an example: the treatment of diabetic macular edema (DME). The so-called “gold standard,” a term that I abhor, is derived from the Early Treatment Diabetic Retinopathy Study (ETDRS), a study completed 24 years ago.

The ETDRS was designed to determine whether or not Argon laser photocoagulation was effective. It was not designed to find the best laser protocol, and, of course, it could not test strategies that weren’t developed at the time. But as a consequence, laser became, and remained, the “gold standard.” And if you have a “gold standard,” everything else must be sub-standard. So say you have a new patient with early DME. The conservative thing is to use the gold standard treatment. But say that doesn’t work. So maybe you try an intravitreal steroid. And say that doesn’t work. And then you try something else, and that doesn’t work either. Finally you try a controversial new drug, one that is labeled as a “rescue therapy.” Interestingly, it gets rid of the macular swelling, but the patient’s vision does not improve, so it hasn’t worked either.

Rescue Therapy

درمانی که در شرایط خاص (بیماری نادر، بیماری مقاوم به درمان) انجام می‌شود.

But possibly it would have worked if it had been tried earlier in the course of treatment—before it had to contend with a disease that was further along and an eye that has had to put up with the side effects of prior therapies.

That is exactly what happened with anti-vascular endothelial growth factor (anti-VEGF) therapy for DME. Anti-VEGF had been around for years, but there was a gold standard (laser), so anti-VEGF was a last resort rather than a first-line treatment. The Diabetic Retinopathy Clinical Research Network (DRCR.net), a very capable NEI/NIH-funded group that assists with study design and statistics, set out to show that intravitreal injection of the steroid triamcinolone was superior to Lucentis and to laser for treatment of DME. And Lucentis won, hugely. Laser, the “gold standard,” worked a little, and triamcinolone had a negative effect. But that was after years of believing that the anti-VEGF agent would not work because it hadn’t been fairly tested and wasn’t the “gold standard.”

Within ophthalmology, what challenges do you see that call out for new thinking and new treatments?

Charles I’m a vit-ret surgeon, so the things I see include dry age-related macular degeneration, proliferative vitreoretinopathy, a pathogenesis-specific treatment for glaucoma, and retinitis pigmentosa