

# Cutting through the Haze

## Cataract Surgery, Yesterday, Today and Tomorrow

"The light is not quite out but vision is really hazy. Especially at night. Glare is increasingly annoying and incoming car lights are hardly tolerable. It seems like everyone has their super-high beams on." I hear these very words time and time again in my office. And one of my daytime occupations is to help people "cut through the haze." Their complaint is most often due to the development of cataracts. Luckily, most, but not all, people with this complaint come to see me reasonably soon. Some wait longer and their vision deteriorates significantly. Driving becomes hazardous. In fact, in the USA, the burden of cataracts on vision is quite significant. It is overwhelming worldwide where an estimated 30 million people are blind from cataracts, a reversible condition.

### **A Brief History of Cataract Surgery**

It is unclear what the impact of cataracts through history may have been. Since most cataracts develop as a result of the aging process and since longevity was probably not the norm in past centuries, a clear statistical assessment may not be possible. However it is undeniable that cataracts have affected people in centuries past and for many centuries, surgeons have devised procedures to eliminate this blinding condition. More than a millenium ago, in India, Baghdad and Cairo, and other cradles of surgery, ophthalmologists were already at work, reversing blindness.

The first such procedure was called couching and it was simple and surprisingly effective though the complication rate must have been high. With a needle and with no anesthesia or antibiotics, the surgeon simply pushed the cataractous lens **INSIDE** the eye and let it drop at the bottom of the eye. As surprising as it may seem, couching is still practiced in a number of countries where modern surgical technique has not become widespread. Many improvements have developed since to give rise to the elegant procedure that I perform today. I will try to describe some of the steps of this incredible historical saga.

In the 18<sup>th</sup> century Jacques Daviel, a French surgeon, described a procedure where the lens with the cataract was taken **OUT** of the eye. That was a significant transformation. One of the drawbacks of the old as well as the improved procedure was that the power of the removed lens to bend light was lost. So vision remained blurry unless very thick glasses were worn. And that was the norm. Perhaps the next significant step was when a British ophthalmologist, Harold Ridley, inspired by one of his students question, and observing that downed Spitfighter pilots in world war II had "glass" in their eyes that did not cause much inflammation, came up with the idea and design for a lens to be implanted inside the eye to replace the old lens. As in many instances in the history of science, engineering and medicine, it took decades for the proposed implantable lenses to reach near perfection.

Even after we put a man on the moon and Neil Armstrong took his first steps on our planet's companion, cataract surgery still had a few steps to go. One of the remaining problems was that the wound created to remove the large cataractous lens had to be large and we had no sutures delicate enough for eye tissue. So following their cataract surgery, many people, including my father in law, were hospital guests for weeks. Their head had to be immobilized with sand bags to allow for natural healing of the wound. Soon sutures became available and the immobilization was no longer needed and the artificial lenses were starting to mature. Surprisingly that is when one of the most dramatic steps in modern cataract surgery was contributed by the American surgeon Charles Kelman. Kelman, an accomplished saxophone player, wanted to be a musician. Humankind will be forever indebted to his father for asking him to ALSO become a doctor! Dr. Kelman, in his daytime job, invented and refined the most modern way of performing cataract surgery, known as phacoemulsification. It allows for breaking (emulsifying) the lens (from the Greek word phaco) inside the eye and aspirating the debris just like a vacuum cleaner does with the dust on your carpet. The great advantage is that it can be done with a small needle through a microincision. The incision I create today is so small that it does not require suturing. The procedure is careful, precise and very fast (10 minutes in my hands) and visual recovery is very prompt. Most of my patients see well enough the next day to want to drive themselves to their follow-up appointment (I still ask them to bring a driver the first day, but I do not prescribe sand bags!).

### **Benefits of Microincision Cataract Surgery**

Following microincision cataract surgery patients mention to me several reasons for their satisfaction. Some benefits have been expected and some come as some sort of a surprise.

Good **daytime vision** is always nice. Good **night time vision** and a significant reduction in glare allow many to resume **confident night driving**. Excellent **color vision** is one of the least expected benefits because due to the gradual nature of cataract development patients get used to the dim colors and do not realize the color perception changes. In fact the colors again appear so vivid that some patients ask if I implanted a colored lens in their eye. Some patients are shocked at the combination of mismatched color clothes they wore for years not realizing the true colors because of the cataract. Finally, less or **no dependence on glasses** is what my patients and I consider a "bonus."

### **The Art of Cataract Surgery**

In addition to the technical sophistication of the cataract procedure, I found through the years that this evolving art can be further refined. Such refinement is essentially based on a close collaboration between surgeon and patient. I personally try to spend a significant amount of time with each one of my patients and understand their initial frustrations and their expectations. We work together on their vision requirements and what they would prefer the surgery to offer. Some patients like the outdoor and choose to achieve the best

distance vision possible without glasses for both eyes. Some like to have the best of both the golfing and the reading worlds and opt for monovision as described in my last article. In addition to this joint preoperative planning I personally perform all the necessary critical measurements myself, instead of deferring to technicians in my office. These measurements are done meticulously. As the old surgical saying goes: Measure twice, cut once. Finally and following surgery I like my patients to have immediate and direct access to me if they have any question or concern. So all my patients get my cell phone number and are encouraged to call. Most never do, but they tell me that they feel truly reassured knowing that they can do so. Often if I feel they may be too shy to call I call them myself to make sure they are well.

### **The Future of Cataract Surgery**

So what does the future hold? Well, as Neils Bohr and Yogi Berra used to say: It is very hard to make predictions, especially about the future! Educated guesses are fair game however. So I will present you with a few:

- 1) The incision and instrumentation for cataract surgery may become smaller yet allowing the procedure to be performed in the office.
- 2) The implantable lenses will become flexible allowing for full distance vision and reading without glasses in both eyes. I alluded to some of these developments in my last article.
- 3) The speed of the procedure, and hopefully its cost, will improve dramatically. There is an old saying in Engineering circles that if Aeronautic Engineering had kept pace with Computer Engineering, we would be flying from New York to Los Angeles in one minute for one dollar. Well my dream is to realize the one minute, one dollar cataract extraction procedure in my lifetime. I am sure this dream is shared by Medicare officials! That would also allow us to seriously make a dent in the worldwide burden of blindness due to cataracts.
- 4) At some point the biochemical process underlying cataract formation may be understood to a point that it can be controlled, stopped and possibly reversed. There is significant research being performed along these lines. No product is yet known to stop the progression of cataracts but, many years from now, that may change. If this were to happen that would essentially eliminate the need for cataract surgery. I have started my saxophone lessons. Just in case.