

A Focus on the Most Important Innovation in Cataract Surgery and Future Perspectives

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Abstract

Our patients having cataract surgery are much more demanding in terms of contrast sensitivity and visual acuity at all distances. Today, we have many opportunities to satisfy their expectations thanks to the new premium intraocular lenses and finally, the possibility to really perform cataract surgery using lasers.

Keywords

Cataract extraction, phacoemulsification, premium IOLs, femtosecond laser

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Today, we bear witness to a rapid and striking technological evolution so that the expectations of cataract patients have increased and it is no longer sufficient to guarantee patients good visual acuity for far distances. In fact, the majority of patients not only want to have good visual acuity at all the distances without glasses, but paradoxically desire to see as well as people of the same age who have no need for cataract surgery. Therefore, the concept of refractive cataract surgery is gaining currency.

With the perpetuation of ultrasonic phacoemulsification, since the 1970s, the dream of all ophthalmologists working in anterior chamber surgery has been to perform cataract extraction through an incision of 1mm and then to refill the capsular bag with an injectable lens so to maintain accommodation.

At the end of the last century, to fulfil this ambition many different energy sources have been utilised, such as various lasers with various wavelengths, water, etc; however, after many attempts we can now say that they have failed, because even if they were cooler and safer than ultrasound, they were less efficient and a lot of time was necessary to conclude an operation due to nucleous hardness. Therefore, it was only at the beginning of the century, with the introduction of ultrapulse technology that it was possible to perform a sleeveless technique using ultrasound. Since then, all the leading companies producing phacoemulsifiers have adopted this technology and have developed sophisticated software to control fluidics and anterior chamber stability.

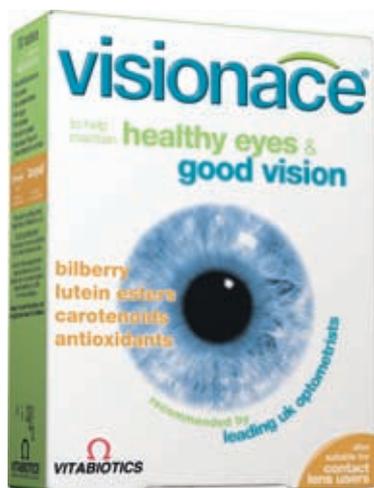
Furthermore, over the last few years the introduction of new micro- and nanosleeve techniques allows practitioners to perform coaxial phacoemulsification through an incision of 1.8–2mm. Therefore, we can say that we are able to perform microincision cataract surgery with both coaxial or bimanual techniques, but we are still waiting for the perfect intraocular lens (IOL), which would have the capacity to maintain accommodation and to correct all eye aberrations.

During the last few years, all the most important companies producing IOLs have proposed new designs and materials, which has led to the introduction of the concept of 'premium lenses'. These lenses allow the correction of presbiopia, astigmatism and spherical and chromatic aberrations, prevent posterior capsule opacification, block wavelengths that are potentially dangerous for the macula and also maintain accommodation. However, these lenses do not suit everybody, not least due to the matter of cost. In fact, some patients can be unsatisfied in terms of contrast sensitivity loss or the presence of various dysphotopic phenomena (glare, halos, ghost images, etc.) so accurate patient selection is paramount. Therefore, it is necessary not only to stress the focus on patient counselling and conversation, but also to submit specific questionnaires, especially at a time of economic crisis in which, for example, Italian newspapers and the media in general feature many advertisements that attempt to persuade people that positive results are possible without any risks, I have found that I spend much more time educating and informing my patients of the risks involved so that they have realistic expectations of the outcomes of surgery. Consequently, only through increasing consultation time can we have, using premium lenses, a very high level of patient satisfaction.

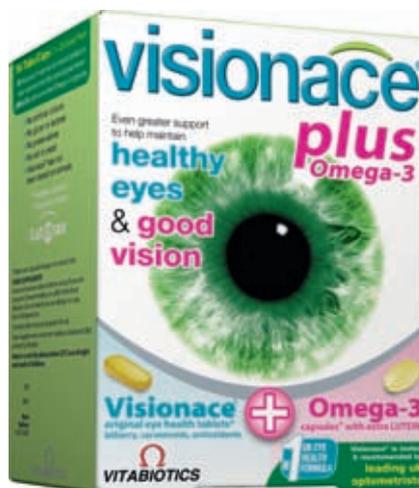
For this reason, we have witnessed an ever-increasing dissemination of all premium lenses in general but especially toric lenses. These lenses are very interesting. The implantation is very safe and easy and the post-operative refraction rate is now stable. This makes it possible to obtain a predictable correction of pre-existing corneal astigmatism. In fact, the latest models guarantee high rotational stability without the risks of severe surgical and post-operative complications. Therefore, I think that the whole premium lens market will see a big increase in the coming months, particularly the presbyopic lens market. In fact, all ophthalmic surgeons have been waiting for years for a lens that is capable of simultaneously improving distance, intermediate and near visual acuity.



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Having reviewed initial results with a dual optic accommodating IOL, I am convinced that this lens offers the best option for presbyopic patients today. However, cost is still a major concern.

In my opinion, in the near future, cataract surgeons who do not implant premium IOLs will face many problems in satisfying their patients' wishes. In fact, there will always be an alternative offer around the corner. So even if 80% of patients continue to prefer a monofocal IOL, the incorporation of premium lenses in our everyday practice is essential. In fact, by only offering premium lenses, patients know that their doctor is able to satisfy them with all the most innovative solutions.

Furthermore, in the field of phacoemulsificators, in my opinion, we are close to a new era. In fact, after 50 years, in which ultrasounds have represented the gold standard for cataract extraction, a new energy source seems to be about to prevail. A new generation of femtosecond laser is being developed that seems to allow not only safe and refractive precision corneal surgery to be performed, but also the crucial steps in

cataract surgery. However, we do not know if the new generation of femtosecond lasers for cataract surgery is one of the most important innovations of the beginning of the century, but it is surely the most exciting for the future.

In fact, being able to perform surgery with laser anterior capsulotomy, corneal incisions – which can be used as cataract tunnel – paracentesis, relaxing incisions and so on, are of great benefit. Also, optical coherence tomography (OCT)-guided nuclear fragmentation will probably increase refractive results, reducing the risk of complications such as posterior capsule rupture, endophthalmitis and endothelial cell density loss. In fact, the first clinical results show that femtosecond laser really has the potential to cut the nucleus into the desired size and shape.

Therefore, even if there are many questions that need to be answered and the clinical trials are ongoing, it is easy to think that femtosecond cataract surgery will further penetrate the market in the future, allowing our patients to take full advantage of all the benefits of premium IOLs. ■