# Treatment and correction of presbyopia

## Initial experience with the new excimer laser SUPRACOR procedure

By Dr Dominique Pietrini

The treatment and correction of presbyopia continues to be a key area of clinical research, innovation and refinement in the field of refractive and cataract surgery. Accommodative solutions for presbyopia include the implantation of accommodating IOLs or the recovery of natural accommodation via sclera and lens manipulations.

However, the true mechanism of accommodation remains to be fully understood and real accommodative solutions are still under scientific investigation. Pseudoaccommodative techniques include the use of multifocal IOLs, pinhole and corneal inlays, or multifocal corneal approaches using excimer and femtosecond lasers.

### An excimer-based technique

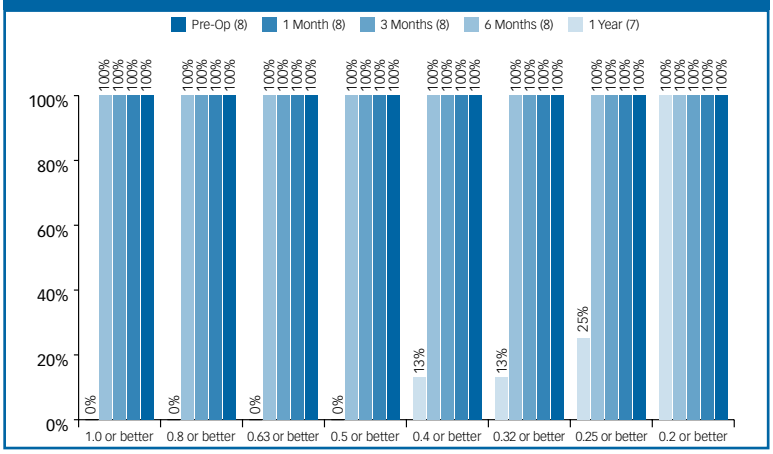
Of the many corneal-based methods developed in recent years, numerous involve the use of an excimer-based technique, where LASIK-based procedures have the obvious advantage of using a well-known, accepted and safe technique with the option to easily retreat. Corneal applications also offer the least invasive approach if the patient wants to get rid of their reading glasses. Although the outcomes have been generally safe and effective, providing an improvement in near vision, all presbyopic solutions result in at least one compromise, so the challenge to find an optimal solution continues.

I have used a number of excimer-based approaches for treating presbyopia during the past 15 years. However, with these solutions, although providing the required multi-focality to afford psuedoaccommodation, there can be a compromise between achieving the optimal near and distance vision outcomes, which can lead to the induction of additional undesired aberrations within the pupil region. These unwanted aberrations can be caused by the surgically induced spherical aberrations or created by combining the near treatment with the distance correction, causing an overlap of the optical zones and transition zones. Overall, these aberrations can cause a loss of distance vision or quality of vision.

A new excimer-based algorithm, known as SUPRACOR, has been developed by Technolas Perfect Vision (TPV), which is designed to provide the near addition for treating presbyopia, while minimizing the induction of any undesired aberrations within the pupil region. This aberration-optimized presbyopic algorithm can be applied to a broad range of presbyopic patients, and may also be suitable for post-LASIK candidates as well. This treatment benefits from being a bilateral LASIK treatment approach, with the same profile applied to both eyes so there is no monovision.



**Figure 1:** SUPRACOR — binocular uncorrected near visual acuity results at 1 year.




### In short...

The treatment and correction of presbyopia continues to be a key area of clinical research and refinement in the field of refractive and cataract surgery. In this article Dr Pietrini discusses his use of the new SUPRACOR procedure for presbyopia and the improvements his research has revealed in both near and distance visual acuity, leading him to believe that with the current data this new procedure from Technolas Perfect Vision is a safe and effective solution to presbyopia.

**Sidebar 1:** Case study.

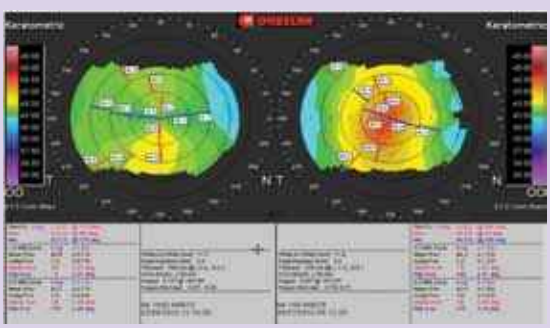
- Female
- 55 years
- SUPRACOR treatment OD and OS

**OD pre-op data:**
Refraction: +2.00/−0.5D/15 Add+2.25 = 20/20
Monocular UCVA: 20/50 (Far)
20/200 (Near)
Binocular UCVA: 20/50 (Far)
20/100 (Near)

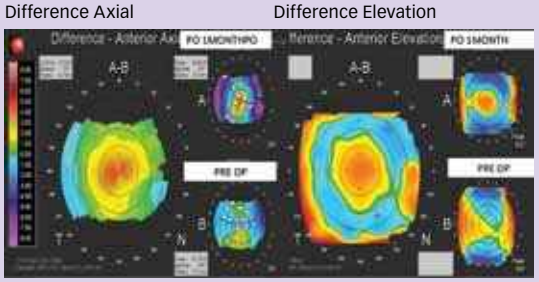
**OS pre-op data:**
Refraction: +2.25/−0.5D/165 Add+2.25 = 20/20
Monocular UCVA: 20/63 (Far)
20/200 (Near)
Binocular UCVA: 20/50 (Far)
20/100 (Near)

**OD 1M post-op data:**
Refraction: +0.25/−0.5D/110 = 20/20
Monocular UCVA: 20/20 (Far)
20/200 (Near)
Binocular UCVA: 20/20 (Far)
20/20 (Near)

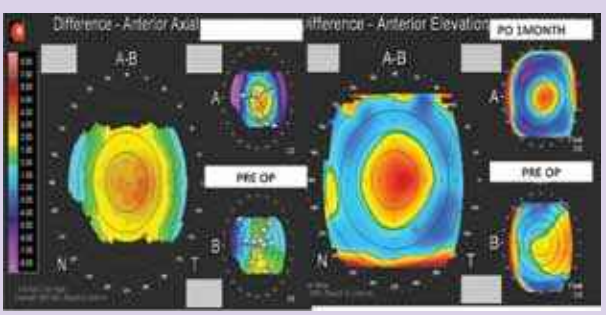
**OS 1M post-op data**
Refraction: +0.25 = 20/20
Monocular UCVA: 20/20 (Far)
20/25 (Near)
Binocular UCVA: 20/20 (Far)
20/20 (Near)



Difference Axial Difference Elevation




Difference Axial Difference Elevation



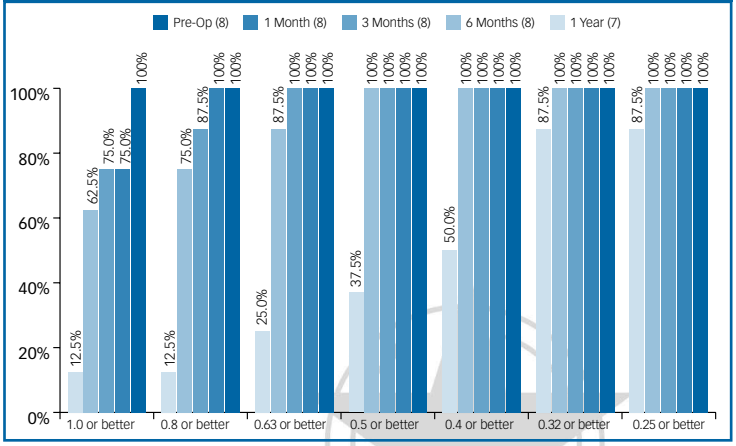

SUPRACOR can be performed on either the TECHNOLAS 217P or any TECHNOLAS excimer laser operating at 100 Hz and equipped with APT and the Advanced Control Eyetracking (ACE) technology.

I have been part of a European, prospective, multicentre, bilateral clinical evaluation into the safety and efficacy of the SUPRACOR treatment as part of the Conformité Européene (CE-Mark) certification. The other participants in this study are Dr Jean-Jacques Chaubard (Nice, France), Dr Jorge Castanera (Barcelona, Spain), and Dr Antoine Roure (Nice, France).

## Significant improvement in near vision

I analysed the results of the bilateral SUPRACOR procedures I conducted on a subgroup of 8 patients with a mean age of 56.3 years, and with all patients aged over 50 years. At 1 year post-op, there was a significant improvement in binocular uncorrected near visual acuity (UNVA), with 100% of patients achieving 1.0 decimal or better, compared with only 13% of patients achieving 0.4 decimal preoperatively (see Figure 1). A considerable improvement in binocular uncorrected distance visual acuity (UDVA) can also be

**Figure 2:** SUPRACOR — binocular uncorrected distance visual acuity results at 1 year.




observed at 12 months follow-up. One hundred percent of patients are 1.0 decimal or better at 12 months postoperatively, compared with 12.5% preoperatively (see Figure 2). Early experience also indicates this excimer presbyopia procedure provides a high degree of safety, with 81.3% of patients experiencing no change in best corrected distance visual acuity at 3 months follow-up and only 12.5% losing 1 line of monocular best corrected distance visual acuity (BCDVA) and 6.3% gaining 1 line. By 6 months follow-up, no patients had lost any lines. A case study of a typical outcome is shown in Sidebar 1.

**High level of Patient satisfaction**

In addition to measuring the visual outcomes of the SUPRACOR procedure, a subjective patient questionnaire was also conducted. The results of the questionnaire indicated a high level of patient satisfaction. Preoperatively, none of the patients were able to read any small print material such as menus, short messages or newspapers and only 12.5% could read the newspaper headlines. At 12 months follow-up, all patients could read the headlines, newspapers, menus and short messages. All patients no longer need glasses for watching the television or computer work, versus 75% of patients requiring glasses for TV preoperatively. Two thirds of patients no longer need glasses for night-time driving, with two thirds saying their night vision is preserved and one third reporting it is better. Eighty-six percent of patients are happy with the outcome, agreeing that they have the impression they can live life without glasses and would recommend the SUPRACOR procedure to a relative or friend. Importantly, all patients reported feeling comfortable without glasses indoors and outdoors, previously feeling uncomfortable in both settings.

**Effective and safe solution**

As with all procedures, successful patient outcomes with the SUPRACOR procedure require a combination of both the right treatment algorithm and laser equipment and as well as appropriate patient management from the surgeon and clinic staff. Thorough patient selection, education and management should be applied preoperatively and postoperatively.

Further longer term follow-up data is required to confirm the stability of these outcomes, but according to the current data available, SUPRACOR certainly appears to provide an effective and safe solution to presbyopia, avoiding the previously reported compromises experienced with other excimer based algorithms, such as diminished distance vision. Because it is a bilateral treatment, it avoids any compromises associated with monovision. Furthermore, the treatment offers the option for easy enhancement and has the potential to be applied to post-LASIK patients. The SUPRACOR procedure received CE Mark approval in May 2011.

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Dr Pietrini has indicated no financial interests in the subject matter of this article