Multifocal LASIK looks good in the long term

Bi-LATERAL multifocal LASIK treatment improves near vision while maintaining good distance vision in hyperopic presbyopes, according to the long-term results of a Canadian multi-centre study presented at the XXIII Congress of the ESCRIS.

The study involved 61 eyes of 33 hyperopic presbyopic patients with a mean age of 56 years, ranging from age 47 to 65 years. Their mean pre-operative sphere was +1.65 D and the mean cylinder was +0.43 D. All underwent a pupil-size-dependent multifocal ablation profile in which the cornea’s centre was ablated for near vision and the periphery for distance vision, said Bruce Jackson MD, from the University of Ottawa Eye Institute, Ontario, Canada.

One year after surgery, 81% of the patients had monocular uncorrected distance visual acuity of 20/20 or better, and 100% had binocular uncorrected distance vision of 20/20 or better, compared to four percent prior to the procedure. Between three and six months after surgery, there was a slight drop in monocular uncorrected distance vision of 20/25 or better, from 84% to 74%. However, one year after surgery, 94% of the patients had 20/25 or better monocular uncorrected distance vision.

“This is comparable to any of the laser company’s hyperopic treatment results,” Dr Jackson said.

Only one month after surgery, all patients had binocular uncorrected distance visual acuity of 20/20 or better monocular uncorrected distance visual acuity of 20/40 or better compared to 67% before surgery. Most, 88%, had binocular uncorrected distance visual acuity of 20/25 or better compared to 20% prior to surgery, reported Dr Jackson.

Improvements in near vision

Dr Jackson also conducted monocular reading performance tests that evaluated functional vision. The researchers measured reading acuity based on number of words read correctly, maximum reading speed and critical print size determined by the smallest font at which maximum speed was possible. After three months, 100% of the patients reached the J3 or better level without correction. In contrast, 86% of patients required correction to read J3 before surgery. The majority, 91% performed at the J1 level three months after surgery without correction, compared to 16% before surgery.

The research team also wanted a subjective evaluation of the procedure’s performance. According to patient questionnaires, 75% were satisfied with their overall visual sharpness and clarity without correction 12 months after surgery compared to 71% with correction prior to surgery.

However, satisfaction levels did drop between six and 12 months, he noted. Some 88% of the patients reported that they were satisfied with their distance vision in daylight without correction compared to 85% with correction prior to the operation.

While 84% of the patients were satisfied with their near vision without correction six months after surgery, by 12 months this had dropped to 63%. A similar drop also occurred in patients’ satisfaction with uncorrected vision at night. However, the patients’ satisfaction had not changed from the preoperative level with glasses.

Thirty percent of patients did not use glasses post-operatively for any activities, whether driving at night or reading the smallest print. Approximately 50% used glasses occasionally, particularly for using a computer. None of the patients used glasses for driving at night or recreational activities. Contrast sensitivity stayed within the normal range post-operatively.

“It was the night that we were a little bit surprised at,” he added.
that they were really functioning extremely well,” said Dr Jackson.

**Pseudoaccommodation**

Over the last few years, interest has increased in understanding the mechanisms involved in presbyopia and finding effective surgical treatments, Dr Jackson told his audience.

“And really, we don’t have a good way to restore true accommodation, so we’ve been using pseudo accommodation,” he said.

In pseudo-accommodation, near vision improves based on the projection of simultaneous images on the retina through various foci, and because of a small pupil and a subjective increase in amplitude of accommodation, there may be an increased depth of focus. However, there is no change in the lens power due to ciliary body activity.

Pseudo-accommodation is seen with against-the-rule astigmatism, negative spherical aberration, prolate or multifocal corneas, multifocal IOLs, and accommodating intraocular lenses. It also occurs in association with monovision refractive surgery, conductive keratoplasty, scleral relaxation surgery and intracorneal inlays.

“One of the advantages of creating a multi-focal cornea is that it is less invasive than intraocular surgery, which the patient likes,” said Dr Jackson.

He noted that the fact that the surgeon uses an established and improving laser vision technology could also be considered advantageous. In addition, the surgeon can correct a refractive error and customise the ablation profile during the procedure.

Some of the concerns about the treatment are the risk of visual symptoms, and a loss of quality of vision that is dependent on pupil size. There is also the question of whether patients get enough correction especially if their hyperopia progresses with age.

For the study’s procedures, the superb distance vision but poor near vision or the reverse,” Dr Colecha said.

“Bifocal or multi-focal refractive surgery is a trade-off between distance and near vision; the outcome may be the cornea area of 3.0 mm for near vision with a central addition of +0.75 to +2.0 dioptres, and an optical zone of at least 6.0 mm for distance vision and a transition zone for intermediate vision. After PresbyLASIK, patients often experience blurred distance vision that lasts between three and four weeks. This phase is part of the progressive neuroprocessing adjustment of simultaneous vision.

Contraindications for central PresbyLASIK are patients with more than 2.0 D of presbyopia, astigmatism greater than 2.0 D and dry eye syndrome, or multifocality is affected by inadequate film distribution on the cornea, said Dr Colecha.

“We find that with the development of new surgical techniques, yesterday’s successful refractive surgery patient is returning for further treatment to alleviate presbyopia.” he said.

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