Cornea surgery at the University of California, Irvine, director of refractive, cornea and cataract straightforward,” said Roger Steinert MD, recent study. Penetrating keratoplasty, according to a zigzag incision in both the donor and host. Postoperatively, patients receive antibiotic and corticosteroid eyedrops three times daily for two weeks. Contraindications for Intacs implantation include central corneal opacities and inadequate pachymetry, said Dr Colin. The best candidates are patients with keratoconus with contact lens intolerance, no scars in the centre, at least 20/50 best-corrected visual acuity and corneal thickness of 450 microns or more at the sides of the segments. Reviewing the results of patients treated at CHU Bordeaux, Dr Colin said that five eyes out of 35 have had the Intacs explanted over the five-year-old follow-up period because of unsatisfactory results. “There were no major problems with these implants but some patients always expect more. In the end, penetrating keratoplasty was performed with very good postoperative outcomes for these patients. It is straightforward to perform a lamellar or penetrating keratoplasty even in patients with Intacs,” he said. Dr Colin said that one of the clear advantages of Intacs implantation is that it is a fully reversible procedure. “Removing Intacs is relatively straightforward once you follow the same steps as for the initial procedure. Using a diamond knife, you cut to two-thirds depth, reopen the incision and use Sinskey hooks to pull out the segments. You can then proceed with penetrating or lamellar keratoplasty in the same procedure,” he said. Of the other 30 eyes followed over five years, Dr Colin said that the results were very satisfactory overall, with the mean best-corrected visual acuity improving from 0.34 to 0.49 and 0.46 at one and five years respectively. Mean spherical equivalent decreased from -7.6 D (+/-2.95) to -3.86 D and -3.95 D at one and five years postoperatively. The mean decrease of the average K value was 4.6 D at one year and 4.0 D at five years. Dr Colin noted that for cases where keratoconus is associated with high myopia, Intacs can also be combined with a phakic IOL in order to correct the residual anisometria. Femtosecond laser option Discussing the impact of femtosecond laser technology on Intacs implantation, Dr Colin said that it gives the surgeon an attractive alternative to manual dissection. “It is very efficient. In six to 10 seconds, we can create the intracorneal channels with the correct depth, width and shape required. The only slight difference between mechanical and laser dissection is that in some cases it is more difficult to implant the segments with the femtosecond laser because there are always some collagen bridges remaining in the channel. So you have to push the segments more firmly in order to implant them properly,” he said. Dr Colin also believes more studies are needed to try to address some of the key questions surrounding Intacs implantation. “All keratoconus cases are different, so it is difficult to establish a perfect nomogram. Where should we make the incision - the temporal axis, steepened axis or comatic axis, where the patient has the most comatic aberrations? What is the optimal length of these incisions? Do we need a suture to increase the biomechanical effect of the PMMA implant in the cornea? If we put a suture in how long do we need it there? Must we use same thickness Intacs in the same eye? If we can mix them, is it better to put the thicker segment inferiorly or superiorly?” he asked. The arrival of femtosecond technology also raises interesting questions for the surgeon, said Dr Colin. “Are channels created with femtosecond laser better than mechanically dissected ones? If we use the laser, is it better to create wide or narrow channels? It may be more difficult to use narrow channels to hope to obtain a better biomechanical effect of the PMMA segments.” Intacs are also useful in treating post-LASIK ectasia, said Dr Colin. “In these cases, we have always used one inferior segment because the biomechanics of the cornea have been so changed by the cut performed at the Bowman’s membrane level by the microkeratome. It is easy to implant one segment under a flap, since the flap is usually 100 to 160 microns while the segments are implanted at 70 per cent of the peripheral depth which is usually 400 microns or more. We have obtained good results using this approach,” he said. Joseph Colin Dhormot McGrath in Athens IN TRACT R I N EA L ring segments (Intacs, Addition Technology) provide patients with keratoconus long-term stabilisation of the disease and improved visual outcomes, according to Joseph Colin MD. Addressing delegates here at Cornea Day during the ESCRS Winter Refractive Meeting, Dr Colin said that the results of a five-year follow-up with Intacs suggests that they provide surgeons with a viable therapeutic alternative for ectatic diseases affecting the cornea. “Our study demonstrated that Intacs segments are a safe and efficacious option for the treatment of patients with moderate to severe keratoconus who are contact lens intolerant. The improved functional vision associated with this treatment modality can defer or potentially eliminate the need for corneal transplantation,” he said. Dr Colin, Hopital Pellegrin, Bordeaux, France, said that the broad goals of intracorneal rings in keratoconus are to stabilise the corneal topography, improve uncorrected and best-corrected visual acuity, improve contact lens tolerance and spectacle use and delay the need for penetrating or deep lamellar keratoplasty. Discussing the properties of the Intacs segments, Dr Colin noted that the clear micro-thin PMMA inserts are hexagonal in cross-section, with an arc length of 150°. The new model of the segments allows for an optical zone of 6.0mm compared to 7.0mm previously. “In general, the smaller the optical zone the better the final effect, but the smaller the optical zone the less quality of vision you will ultimately obtain. Many of these implants are being placed in young patients, so the optical zone is too small they tend to be unhappy with glare and haloes caused by the segments.” The surgical procedure for installing Intacs is relatively straightforward, said Dr Colin. The procedure is performed under topical anaesthesia with oral sedation or general anaesthesia depending on the patient’s preference. A temporal radial 1.0-millimeter incision is made in the cornea at 70 per cent depth and a special dissector is used to create two channels for the insertion of the Intacs segments. The implants are then delicately threaded into the channels, one superiorly and one inferiorly, to lift the ectatic portion of the cornea and flatten the soft keratoconic corneal tissue. Postoperatively, patients receive antibiotic and corticosteroid eyedrops three times daily for two weeks. Contraindications for Intacs implantation include central corneal opacities and inadequate pachymetry, said Dr Colin. The best candidates are patients with keratoconus with contact lens intolerance, no scars in the centre, at least 20/50 best-corrected visual acuity and corneal thickness of 450 microns or more at the sides of the segments. Reviewing the results of patients treated at CHU Bordeaux, Dr Colin said that five eyes out of 35 have had the Intacs explanted over the five-year-old follow-up period because of unsatisfactory results. “There were no major problems with these implants but some patients always expect more. In the end, penetrating keratoplasty was performed with very good postoperative outcomes for these patients. It is straightforward to perform a lamellar or penetrating keratoplasty even in patients with Intacs,” he said. Dr Colin said that one of the clear advantages of Intacs implantation is that it is a fully reversible procedure. “Removing Intacs is relatively straightforward once you follow the same steps as for the initial procedure. Using a diamond knife, you cut to two-thirds depth, reopen the incision and use Sinskey hooks to pull out the segments. You can then proceed with penetrating or lamellar keratoplasty in the same procedure,” he said. Of the other 30 eyes followed over five years, Dr Colin said that the results were very satisfactory overall, with the mean best-corrected visual acuity improving from 0.34 to 0.49 and 0.46 at one and five years respectively. Mean spherical equivalent decreased from -7.6 D (+/-2.95) to -3.86 D and -3.95 D at one and five years postoperatively. The mean decrease of the average K value was 4.6 D at one year and 4.0 D at five years. Dr Colin noted that for cases where keratoconus is associated with high myopia, Intacs can also be combined with a phakic IOL in order to correct the residual anisometria. Femtosecond laser option Discussing the impact of femtosecond laser technology on Intacs implantation, Dr Colin said that it gives the surgeon an attractive alternative to manual dissection. “It is very efficient. In six to 10 seconds, we can create the intracorneal channels with the correct depth, width and shape required. The only slight difference between mechanical and laser dissection is that in some cases it is more difficult to implant the segments with the femtosecond laser because there are always some collagen bridges remaining in the channel. So you have to push the segments more firmly in order to implant them properly,” he said. Dr Colin also believes more studies are needed to try to address some of the key questions surrounding Intacs implantation. “All keratoconus cases are different, so it is difficult to establish a perfect nomogram. Where should we make the incision - the temporal axis, steepened axis or comatic axis, where the patient has the most comatic aberrations? What is the optimal length of these incisions? Do we need a suture to increase the biomechanical effect of the PMMA implant in the cornea? If we put a suture in how long do we need it there? Must we use same thickness Intacs in the same eye? If we can mix them, is it better to put the thicker segment inferiorly or superiorly?” he asked. The arrival of femtosecond technology also raises interesting questions for the surgeon, said Dr Colin. “Are channels created with femtosecond laser better than mechanically dissected ones? If we use the laser, is it better to create wide or narrow channels? It may be more difficult to use narrow channels to hope to obtain a better biomechanical effect of the PMMA segments.” Intacs are also useful in treating post-LASIK ectasia, said Dr Colin. “In these cases, we have always used one inferior segment because the biomechanics of the cornea have been so changed by the cut performed at the Bowman’s membrane level by the microkeratome. It is easy to implant one segment under a flap, since the flap is usually 100 to 160 microns while the segments are implanted at 70 per cent of the peripheral depth which is usually 400 microns or more. We have obtained good results using this approach,” he said. Joseph Colin Dhormot McGrath in Athens IN TRACT R I N EA L ring segments (Intacs, Addition Technology) provide patients with keratoconus long-term stabilisation of the disease and improved visual outcomes, according to Joseph Colin MD. Addressing delegates here at Cornea Day during the ESCRS Winter Refractive Meeting, Dr Colin said that the results of a five-year follow-up with Intacs suggests that they provide surgeons with a viable therapeutic alternative for ectatic diseases affecting the cornea. “Our study demonstrated that Intacs segments are a safe and efficacious option for the treatment of patients with moderate to severe keratoconus who are contact lens intolerant. The improved functional vision associated with this treatment modality can defer or potentially eliminate the need for corneal transplantation,” he said. Dr Colin, Hopital Pellegrin, Bordeaux, France, said that the broad goals of intracorneal rings in keratoconus are to stabilise the corneal topography, improve uncorrected and best-corrected visual acuity, improve contact lens tolerance and spectacle use and delay the need for penetrating or deep lamellar keratoplasty. Discussing the properties of the Intacs segments, Dr Colin noted that the clear micro-thin PMMA inserts are hexagonal in cross-section, with an arc length of 150°. The new model of the segments allows for an optical zone of 6.0mm compared to 7.0mm previously. “In general, the smaller the optical zone the better the final effect, but the smaller the optical zone the less quality of vision you will ultimately obtain. Many of these implants are being placed in young patients, so the optical zone is too small they tend to be unhappy with glare and haloes caused by the segments.” The surgical procedure for installing Intacs is relatively straightforward, said Dr Colin. The procedure is performed under topical anaesthesia with oral sedation or general anaesthesia depending on the patient’s preference. A temporal radial 1.0-millimeter incision is made in the cornea at 70 per cent depth and a special dissector is used to create two channels for the insertion of the Intacs segments. The implants are then delicately threaded into the channels, one superi-
Femtosecond laser effective for use in penetrating keratoplasty

Continued from page 22

takes six months to return with conventional penetrating keratoplasty and three months to return with Descemet’s Stripping Endothelial Keratoplasty (DSEK).

“The femtosecond laser PKP procedure appears to have a rate of recovery of vision that may be competitive with DSEK,” he said.

In showing a slide of an eye that had undergone the procedure, Dr. Steinitz drew the audience’s attention to the smoothness of the contour at the incision, with excellent alignment of both the anterior and posterior curvatures. He also pointed to a shadow that he explained was the suture.

“One of the other advantages is the resection of only a very small amount of tissue,” he said. “The suture is mid-depth, it didn’t go to the apex of the tissue,” he said. “It caused the least amount of tissue.”

He said that using the femtosecond laser provides better-quality vision, with less astigmatism and fewer aberrations, compared with transplants using a conventional trephine.

“Why a zigzag is best”

Dr. Steinitz explained that the femtosecond laser makes a wide variety of cut patterns possible, including the standard, top hat, mushroom, Christmas tree, zigzag, and zig square. He said that he quickly settled on the zigzag shape because it provides a hemispheric wound seal, and because the angled edge provides a smooth transition between the host and donor tissue.

He said that using the femtosecond laser provides better-quality vision, with less astigmatism and fewer aberrations, compared with transplants using a conventional trephine.

“The laser does a better job from an optical standpoint, and there’s faster recovery of vision,” he said.

Dr. Steinitz concluded that femtosecond laser corneal transplant is technically feasible and produces better results than those seen with conventional transplant. The zigzag configuration is only possible with laser incisions, he emphasised. He said that the next step in research would be to compare conventional corneal transplantation with that using the femtosecond laser.

“We’re taking a tool from primary refractive surgery, and giving it to the transplant surgeon,” said Amar Agarwal MD of Dr. Agarwal’s Eye Hospital in Chennai, India, in an interview with EuroTimes. He said that use of the femtosecond laser was a good way to reduce the amount of astigmatism.

“The zigzag technique of Roger Steinitz is a very good technique. It helps normal healing much better. Using the IntraLase one can easily do it. It also won the film festival award at ASCRS 2007,” Dr. Agarwal added.