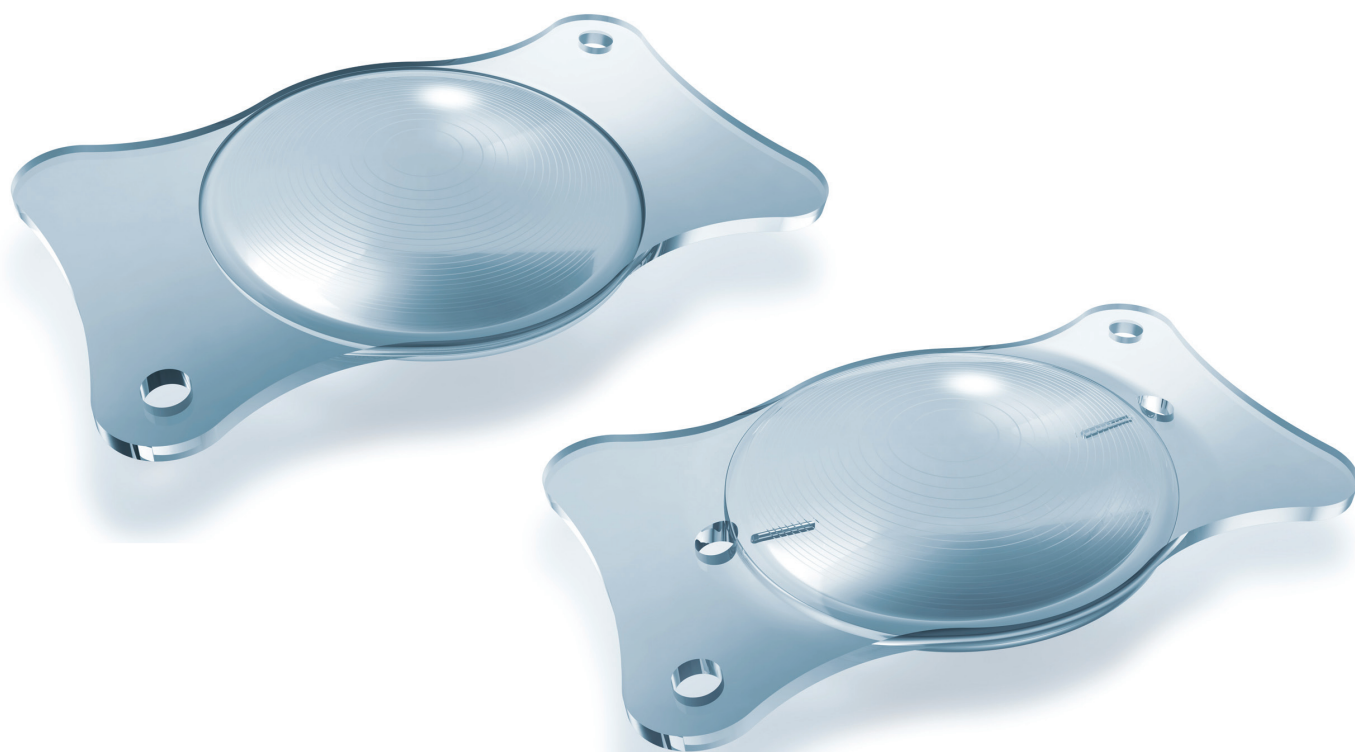


# Cataract & Refractive Surgery

## EUROPE TODAY

## ZEISS AT LISA tri family



An innovative trifocal preloaded MICS IOL  
platform for True Living Vision

# ZEISS AT LISA tri family

A virtual roundtable exploring the innovative trifocal preloaded ZEISS MICS IOL platform for True Living Vision.

## PARTICIPANTS



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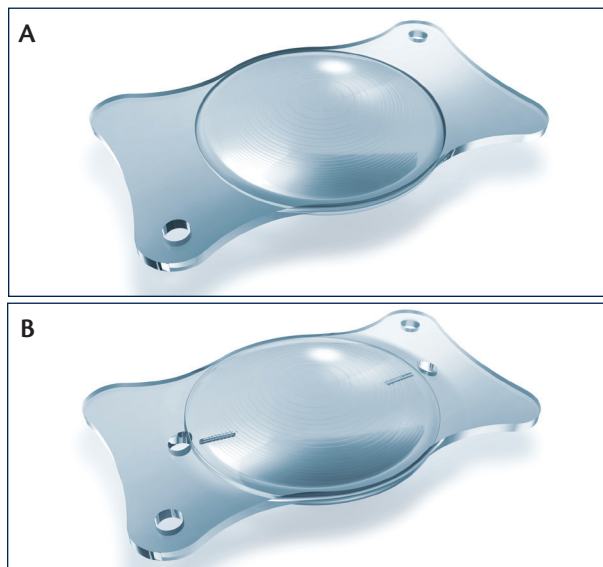
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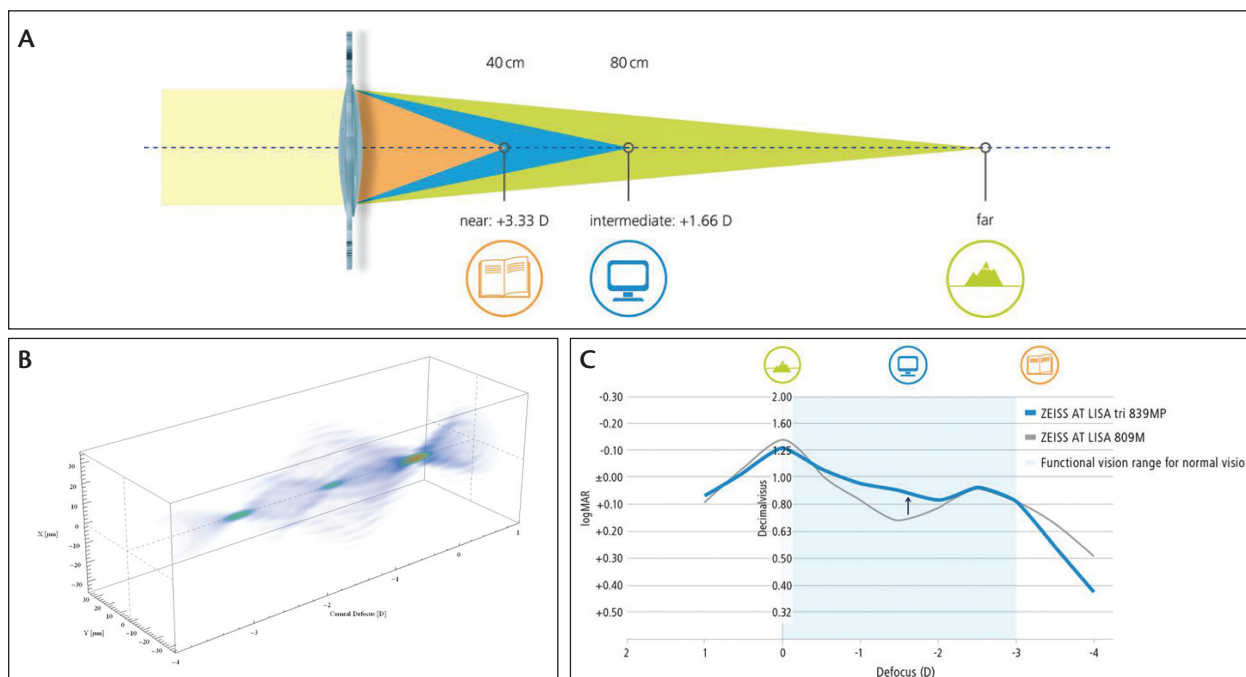
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**Figure 1. ZEISS AT LISA tri 839MP (A) and ZEISS AT LISA tri toric 939MP (B) IOLs.**

*A panel of surgeons (left) was asked to answer 10 questions about the ZEISS AT LISA tri family:*

- 1. What made you switch from bifocal IOLs to the trifocal AT LISA tri family?*
- 2. Compared with other apodized, bifocal, or trifocal convoluted IOLs, what are the benefits of the optical design of the trifocal AT LISA tri family of IOLs?*
- 3. What differences do you see in night vision with the AT LISA tri compared with bifocal, apodized, or trifocal convoluted IOLs?*
- 4. The AT LISA tri IOL is also available in a toric version. What are your experiences with the AT LISA tri toric lens?*
- 5. Now that you have been using IOLs in the AT LISA tri family, how has your patient selection and counseling process changed?*
- 6. What is your referral rate with the AT LISA tri?*
- 7. What kind of changes have you observed regarding patient expectations and information level when they come to your clinic?*
- 8. How has the AT LISA tri family impacted your daily clinical business?*
- 9. You have implanted the AT LISA tri family of IOLs for 2 years. What is your conclusion so far?*
- 10. What do you think the multifocal IOL market will look like 5 years from now?*



**Figure 2.** An intermediate addition of 1.66 D is provided with the ZEISS AT LISA tri family (A). Focal intensity distribution of the AT LISA tri IOL (B). Defocus curves: Visual quality over the range of 25 cm to infinity (C).

## 1. What made you switch from bifocal IOLs to the trifocal AT LISA tri family?

**Körber:** We switched from bifocal IOLs to the AT LISA tri family (Figure 1) as we had been waiting many years for a solution to intermediate vision. We used bifocal IOLs because patients were happy with near and distance vision results; however, vision in the intermediate range was missing and patients complained about poor vision for computer use. We were happy when the AT LISA tri IOL became commercially available, and we began using it rather shortly thereafter.

**Mojon:** I switched from bifocal to trifocal IOLs because I noticed that patients with bifocals were not always happy—they simply could not see well at either intermediate distance or at near. This is no longer an issue with the trifocal lens (Figure 2). I would also say that there are fewer side effects like glare and halos with a good lens. There are several lenses that did not fix these problems, but the design of the AT LISA tri IOL has. With that said, one must continue to inform patients that these visual disturbances can occur during the first couple of months but usually fade thereafter.

**Breyer:** When I initially started using trifocal IOLs, I was skeptical that the design might cause additional halos and glare. I tried implanting the AT LISA tri IOL in a few patients, and I soon determined that they were much happier than those with rotationally symmetric bifocal IOLs and that there nearly was no issue with halos and glare.

Our commitment is based on science; we do not trust what patients tell us subjectively, so we have shown in several investigations and studies looking at defocus curves, halo and glare simulator testing and contrast vision testing with the Ginsburg box that the quality of the trifocal IOL is superior to that of rotationally symmetric bifocal IOLs.

The main difference between rotationally symmetric bifocal IOLs and the AT LISA tri is that the latter provides very good intermediate vision. Nowadays, intermediate vision is crucial, as most of our daily work is done with computers and the use of smartphones and tablets continues to increase.

**Jørgensen:** Today's patients live in an intermediate world, which is the distance between 40 and 80 cm. The trifocal IOL design provides excellent vision within this range, and therefore it is the best thing for me to offer to my patients.

**Kohnen:** We were intrigued enough with the design of the AT LISA tri IOL to implant a couple in our patients, and we found that they were quite happy right after surgery. Therefore, we have continued to use this lens.

## 2. Compared with other apodized, bifocal, or trifocal convoluted IOLs, what are the benefits of the optical design of the trifocal AT LISA tri family of IOLs?

**Körber:** The AT LISA tri is a smooth lens with no ridges on its surface (Figure 3). This translates into less glare and halos, and patient satisfaction is high. Patients

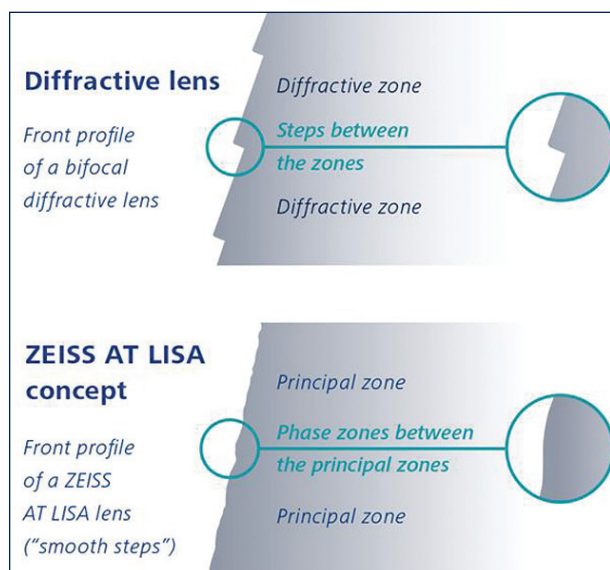


Figure 3. The AT LISA tri lens surface is based on the smooth micro phase technology.

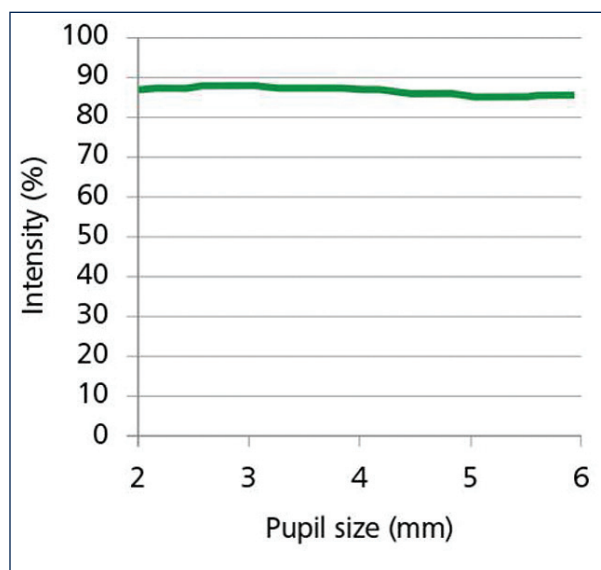


Figure 4. The AT LISA tri has a stable light energy transmittance of 85.7% on average.

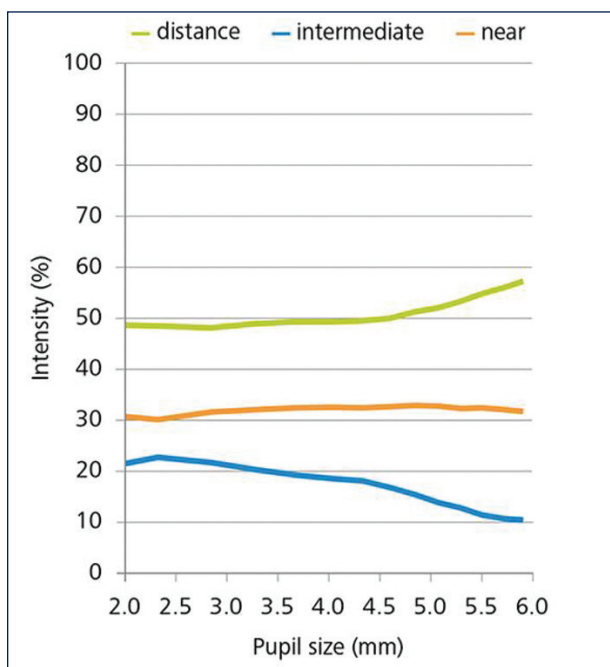


Figure 5. AT LISA tri asymmetrical light distribution.

are happier than they have ever been, especially at night. Although some do experience glare effects, they are willing to accept them because the advantages outweigh the disadvantages.

**Breyer:** One big advantage of the trifocal design of the AT LISA IOL is that it is not apodized or convoluted, which results in good vision and high light transmittance under any mesopic condition (Figure 4). Another argument for the AT LISA trifocal IOL is that it is nearly pupil independent.

**Jørgensen:** This lens also sits well in the capsular bag, which helps to avoid subluxation and ensures that the patient's vision is always in focus. The AT LISA tri is easy to implant through a 2.2-mm incision and, if necessary, Nd:YAG capsulotomy is easy to perform.

**Kohnen:** We were concerned that a trifocal IOL design might cause some vision problems, and on an optical bench it seems that it should be the case. However, our patients are telling us the opposite.

**Mojon:** One advantage of this new design is that it increases the amount of light that can be used across all distances (near, intermediate, and distance). Because more light is available for near vision (Figure 5), fewer patients experience reading problems in dim light. I also like that the lens design allows me to rotate it on both sides, which is useful if I use toric lenses. Independence from pupil size had a big impact on our switch as well.

### 3. What differences do you see in night vision with the AT LISA tri compared with bifocal, apodized, or trifocal convoluted IOLs?

**Mojon:** The AT LISA trifocal IOL provides better night vision than many other lenses I was using before. The improved night vision is something that many of my colleagues in Germany, Austria, and Switzerland are also noticing. The reason for the improvement in night vision is that the optics design of the rings no longer scatters light but rather allows the light to mainly be used for an additional distance. Because the light is no longer lost, this is what we are noticing clinically and why patients have less trouble with nighttime vision.



**Breyer:** We conducted studies with the Ginsburg box for contrast sensitivity and also in mesopic conditions. In comparing the trifocal IOL to bifocal IOLs, results were unparalleled, especially in mesopic conditions. Formerly, if my patient worked on the computer with small letters, I was hesitant to offer a multifocal IOL. Now, I will undoubtedly implant the AT LISA tri IOL.

**Jørgensen:** I expected the haptics and the rings of the AT LISA tri IOL to cause more glare than a bifocal IOL, but it is amazing that patients experience less glare than they do with bifocals. This is a big benefit of the trifocal IOL technology.

Besides intermediate vision, the quality of vision plays a big role in patient satisfaction. With less glare, especially in dim light and at night, quality of vision improves. The mean age of our patients is 55 to 57, and all of them drive at night. So I think that is also the second point in favor of the trifocal IOL compared with bifocal IOLs.

**Kohnen:** About 1% to 2% of patients experience night vision symptoms, including halos and glare, and in these cases I offer them two options: (1) explanting the lens or (2) keeping the multifocality. Most patients actually decide to keep the multifocality.

**Körber:** The difference in terms of night vision is that patients with the AT LISA tri IOL have fewer symptoms of halos and glare than with the AT LISA bifocal and with apodized optics. The distribution of patients with night vision problems with the AT LISA tri IOL is practically negligible. This means that nearly all patients are happy. Thus far, we have not received a request to remove the lens because of glare or night vision problems.

The reason for this is that the optics has been updated to a combination of distance, intermediate, and near zones, and, in the periphery of the lens, there is a bifocal region only (Figure 6). This combination produces better light distribution (50% for distance, 20% for intermediate, and 30% for near) and makes it easy for patients to see well under all lighting conditions and at all distances.

#### 4. The AT LISA tri IOL is also available in a toric version. What are your experiences with the AT LISA tri toric lens?

**Breyer:** We started to implant bitoric IOLs about 8 years ago, mainly for two reasons: (1) These IOLs are thin, even with high diopters, and, therefore, can be implanted through 1.8-mm incisions. (2) If you look at the point spread function and the modulation transfer function, this IOL is much better than monotoric IOLs in high diopters, meaning that you can achieve astigmatism correction up to 12.00 D.

We have found that the AT LISA tri (bi)toric IOL has superior focus equivalent and stability compared with other toric IOLs. This has a lot of advantages for the surgeon,

because once the IOL is implanted, it can be rotated in every direction (Figure 7). If the surgeon misses the mark, it can easily be rotated 5° backward. Simply put, you cannot do that with other one-piece, C-loop toric IOLs.

Therefore, for me, the four-point haptic design is the first toric IOL I recommend to my patients.

**Jørgensen:** The optic of this toric IOL is even better than the optic of other toric IOLs, and the result is better vision. We use the AT LISA tri toric in patients with more than 1.00 D of astigmatism. The AT LISA tri toric IOL is our treatment of choice.

**Kohnen:** About 40% of patients have astigmatism high enough to warrant correction. When toricity is added to an IOL design, one can treat more patients. The holy grail for multifocality is that one must reduce astigmatism to 0.50 D or less.

**Körber:** The toric version of the AT LISA tri IOL is just as easy to implant as the standard IOL (Figure 8), and it centers well in the capsular bag because it has a four-point haptic design. Additionally, the incidence of decentration is low (less than 1%).

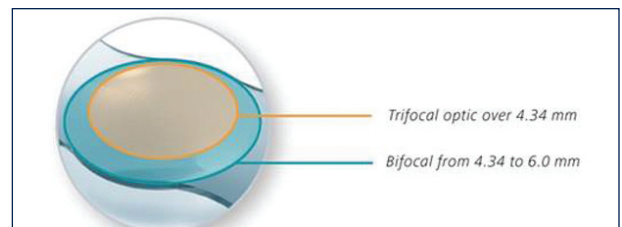


Figure 6. The optic design of the AT LISA tri family, featuring a trifocal center and bifocal periphery.

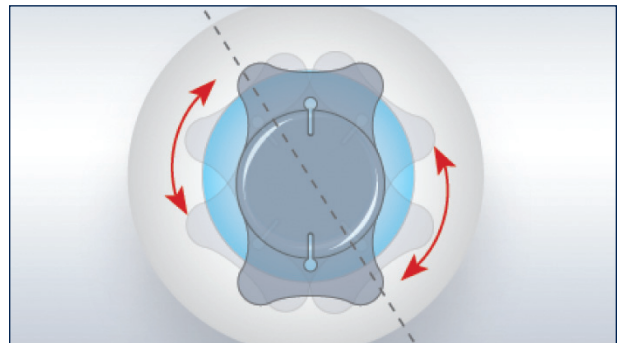


Figure 7. Bidirectional alignment of ZEISS toric IOLs.

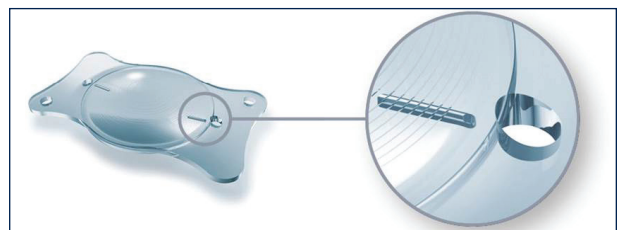


Figure 8. Clear axis marks are located on the posterior side and multifocal structure on the anterior side of the AT LISA tri toric IOL.

**Mojon:** There are two main reasons why I started implanting toric and trifocal toric AT LISA tri lenses: (1) I was so thrilled with the standard CT ASPHINA lens (Carl Zeiss Meditec), and I knew the design was excellent and (2) side effects with patients' vision after surgery are much more rare than before.

I believe that any surgeon who implants multifocal IOLs should use toric IOLs. Any time a patient has more than 0.75 D of astigmatism, it is essential to correct the astigmatism in order to get a good result. I like the AT LISA tri toric IOL because it can be rotated on both sides, as previously mentioned (Figure 7), and it has a large diopter range (Table 1).

Thus far, I have not had to rotate any lens. Two things to note: (1) Remove all of the ophthalmic viscosurgical device from the eye and (2) wait 2 to 4 weeks to rotate the lens if necessary.

### 5. Now that you have been using IOLs in the AT LISA tri family, how has your patient selection and counseling process changed?

**Breyer:** With the AT LISA tri, I can now treat a larger range of patients. I switched my strategy from using it for patients who specifically ask to be spectacle independent to offering it to all patients who might wish for spectacle independence. Happy patients tell their friends and family, and these other people eventually come to see me because they really like the effects and the easiness of the AT LISA tri IOL.

**Jørgensen:** Patient selection and counseling is easier now. In the days of bifocal IOLs, I had to explain that intermediate vision would be a little unclear; however, this is no longer the case with the AT LISA tri family of IOLs.

**Kohnen:** I agree that patient selection and counseling have become a little bit easier. If patients ask for a solution for presbyopia, then it becomes easier for me to select the appropriate IOL. I also think that there is less of a thought process, because there are fewer downsides with the AT LISA tri IOL than with bifocal IOLs, and therefore it becomes easier to select patients for this lens technology. In my practice, many people ask for this IOL; however, at the end of the day they still trust my recommendation. I use a conservative approach, and I do not push patients toward multifocality. With that said, my confidence in implanting these lenses has increased.

**Körber:** Since there are fewer side effects like halos and glare and improved intermediate vision, it is easier to counsel patients on the AT LISA tri IOLs. I also use a glare simulator to show patients what to expect and also to compare this IOL with other styles of lenses.

**Mojon:** The AT LISA tri IOL has changed how I counsel my patients. Before, there was a larger group of patients in

**TABLE 1. DIOPTER RANGE FOR THE AT LISA TRI IOL FAMILY**

#### **AT LISA tri 839MP**

- 0.00 to +32.00 D, in 0.50 D increments

#### **AT LISA tri toric 939MP/M**

- Sphere: -10.00 to +32.00 D,\* in 0.50 D increments
- Cylinder: +1.00 to +12.00 D,\* in 0.50 D increments

\* The preloaded AT LISA tri toric 939MP is available in the diopter range:

Sphere -10.00 to +28.00 D, Cylinder +1.00 to +4.00 D

The non-preloaded AT LISA tri toric 939M is available in the diopter ranges:

Sphere -10.00 to +28.00 D, Cylinder +4.50 to +12.00 D; and Sphere +28.50 to +32.00 D, Cylinder +1.00 D to +12.00 D

whom I would not have implanted a multifocal lens. Now, my indications for implantation have increased, including for refractive lens exchange. With that said, I always counsel patients extensively before surgery. The fact that this IOL produces less glare and halos allows me to implant it in more patients without any postoperative problems and with increased patient satisfaction.

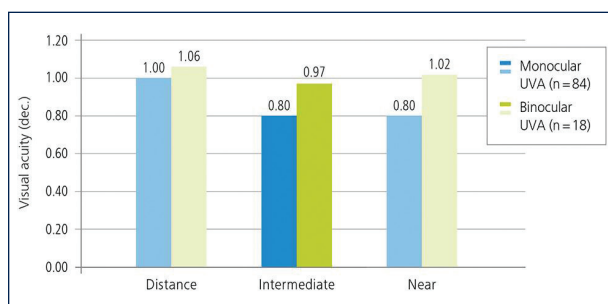
### 6. What is your referral rate with the AT LISA tri?

**Breyer:** My referral rate has increased dramatically. Formerly, with bifocal IOLs, patients who asked specifically for these lenses were somewhat happy but experienced several drawbacks including unclear intermediate vision. Now, with the trifocal IOL, patients have good intermediate vision, less halos and glare at night, and experience a *wow* effect that was not apparent with bifocals before.

**Körber:** In our economic setting, it is a bit difficult to convince patients to pay for a higher class of lens. Our referral rate for the AT LISA tri IOL is about 10%, but this has grown from about 5% with bifocals. As patients talk to each other, we should continue to see more patients asking about this option.

### 7. What kind of changes have you observed regarding patient expectations and information level when they come to your clinic?

**Breyer:** There is a change in patient expectations occurring in Europe now that happened many years ago in the United States. Because US patients pay out of pocket for premium IOLs, they have always been more demanding than European patients. But in the past in Germany and in other European countries, patients tended to allow surgeons to make the decisions. Now more patients educate themselves by going on the Internet and make their own decisions about the IOL they want. I think it is a good thing that patients are more demanding and it makes our daily surgical practice more interesting and gives us the motivation to become refractive cataract surgeons.



**Figure 9.** Enhanced intermediate visual acuity, especially after binocular implantation, is seen with the AT LISA tri IOL.

**Kohnen:** I see a lot of private patients, and this may influence my answer; however, it seems to me today that, if patients want premium cataract surgery, they take the time to inform themselves on the available IOL options. We also explain to patients what their options are, and we come to a conclusion together. As surgeons, we must try to figure out what a patient really wants and decide from that and from information other staff members have gathered during the preoperative process what IOL is the most appropriate.

**Körber:** Patients nowadays are well informed; they look at the Internet, and they talk to friends and family. Therefore, they expect more from cataract surgery. With the AT LISA tri, we can offer a solution that meets their expectations. I recommend the solution that I think best fits the patient's specific situation, and that does not always mean that the trifocal IOL is the best lens. However, for many patients with no specific visual needs or contraindications, it is.

**Mojon:** The expectations of cataract patients and also of those with refractive errors is much higher today than it was in the past. I have seen many patients who are frustrated because their surgeon implanted a standard lens and did not ask them if they wanted a toric or a multifocal lens. I believe today's surgeons should inform patients about these options, even if they are not good candidates. For instance, in patients with advanced glaucoma, I tell them that there are special lenses, toric IOLs, that can be implanted to correct astigmatism. I also share with them that multifocal IOLs are not a good option in patients with advanced glaucoma.

The majority of my patients are Swiss, but I also treat patients from abroad, and I feel happy with this lens. I offer bilateral simultaneous surgery on the same day, and usually by the afternoon (if surgery was done in the morning) or the next day patients are already impressed with their vision (Figure 9). On many occasions, patients tell me that by the next day they can send text messages without glasses and distance vision is excellent. These achievements are especially important for patients traveling from abroad who usually want to travel back home quickly. It is also important to have a low complication rate, as these patients cannot be followed locally.

## 8. How has the AT LISA tri family impacted your daily clinical business?

**Breyer:** Whereas I used bifocal IOLs more hesitantly, I now use the trifocal IOL on a daily basis. So this lens has had two effects: (1) I am offering more trifocal IOLs and (2) people come to me because they want trifocal IOLs.

**Jørgensen:** Business has increased. We live in the intermediate world, and it is important for people to achieve excellent, focused vision in this range. When I implant this lens in one patient, I will likely also implant one in his or her neighbor, brother-in-law, sister-in-law, and so forth.

**Kohnen:** When you look at my refractive cataract procedures, including those performed with the femtosecond laser, what you see over the past 2 years is increased usage of premium IOLs, particularly presbyopia-correcting IOLs.

**Körber:** The number of patients who now opt for multifocal or trifocal IOLs has about doubled in the past 2 years. Some patients come into our practice after hearing about the AT LISA tri IOL from a friend or family member, but most just research the available options.

**Mojon:** The trifocal AT LISA lens has clearly influenced the number of patients I implant with premium IOLs, and this number has increased in the past 2 years.

## 9. You have implanted the AT LISA tri family of IOLs for 2 years. What is your conclusion so far?

**Breyer:** From all of our study results and patient reports, we are more than happy. We have investigated patients' vision in mesopic conditions, spherical equivalent, and halos and glare (Figure 10) and are happy with our findings. It looks like the AT LISA tri is the best rotationally symmetric multifocal IOL we can offer our patients.

**Jørgensen:** I have been implanting bifocal lenses since 1998, but in the early years I did not implant them with much frequency. Now that we have these high-quality lenses, we can implant them in many patients with few side effects. This is an elective procedure that is performed in young patients (mean age, 55 to 60 years), and therefore you must have a good lens. I think you have that today with the AT LISA tri IOL.

**Kohnen:** My overall conclusion is that we have a new lens-based solution in presbyopia correction, and I think the AT LISA tri IOL is a step forward in the right direction.

**Körber:** The conclusion I have drawn after 2 years of using this trifocal is that we now have an option to offer

patients that provides excellent spectacle-free vision for daily work and social activities, completely independent from all light conditions (Figure 11).

**Mojon:** I appreciate the way this IOL unfolds loosely in the capsular bag, even with a small capsulorrhexis. Also, I now have a good option for difficult cases. For example, a 45-year-old woman wished to undergo bilateral clear lens extraction and was slightly myopic in one eye. I was cautious when selecting the appropriate IOL, and I talked a lot about side effects of this surgery. We decided on the AT LISA tri IOL; the day after surgery, she called me and reported that she was most highly satisfied with her vision. Three days later she was on holiday, and she wrote me an email saying that she was extremely happy with her vision.

Years ago, this would have been the type of patient in whom we did not have a lens to implant that will produce good visual results so quickly after surgery.

My favorite design elements of this lens are its four-point haptics and its optical design, which provides more light in the intermediate zone.

## 10. What do you think the multifocal IOL market will look like 5 years from now?

**Breyer:** The trifocal IOL has the potential to become the No. 1 multifocal lens on the market, and the indications for refractive lens exchange will continue to grow. I think the multifocal IOL market will really change over the next 5 years, and people will be more aware that surgery with individually selected multifocal IOLs is reliable and provides excellent results. I expect an increase in the number of patients demanding this comfort and quality of vision.

**Jørgensen:** The future in refractive surgery is IOLs. The LASIK market has been a stagnant market for many years, and the IOL market has grown in double digits. This market will continue to grow as the baby boomers enter the age for cataract surgery.

With a product like the AT LISA trifocal, we can fulfill the requirements of today's patients. Additionally, having a toric version of this IOL means that more patients can be treated, and patients with minor astigmatism will no longer need LASIK enhancements after cataract surgery.

**Körber:** The market is growing. It is difficult to tell how quickly it will grow, however, because on some level it depends on the economic situation.

**Mojon:** The multifocal IOL market will continue to increase. I have noticed more older patients wish to get rid of their glasses, and because I treat a lot of wealthy patients from abroad, they can usually find the finances to implant premium lenses.



Figure 10. Halos and glare simulation with an apodized bifocal (top) and the AT LISA tri IOL (bottom; courtesy of Dr. Breyer).

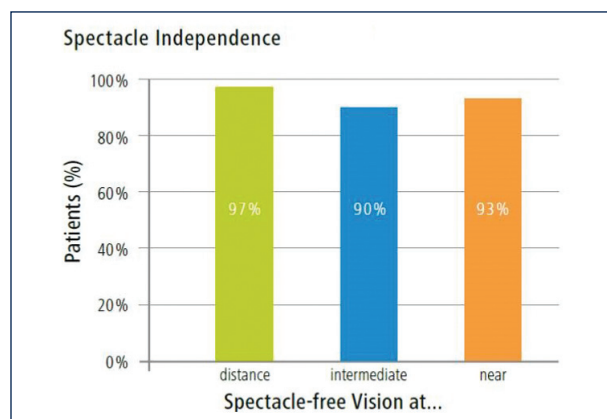


Figure 11. One-month follow-up from an European prospective clinical trial with 186 patients.

**Kohnen:** Worldwide, there are still a very low number of multifocal lenses being implanted. I think the better we get at patient selection, the fewer number of problems we will see with these lenses and the use of multifocality will increase.

Because it is an optical principle, the advantage of multifocality is that it is there forever and will work for years and years. ■