

The Foundation of the American Academy of Ophthalmology  
Museum of Vision & Ophthalmic Heritage

**Conversation Between Harvey Lincoff, MD and Ingrid Kreissig, MD**  
Orlando FL, October 22, 2011

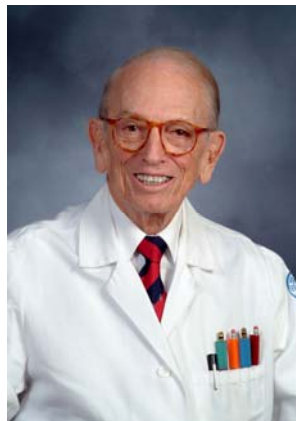
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Drs. Harvey Lincoff and Ingrid Kreissig recorded this conversation on October 22, 2011 during the Annual Meeting of the American Academy of Ophthalmology, in Orlando, FL.

Drs. Lincoff and Kreissig are retina specialists and collaborators for more than 40 years. Dr. Lincoff lives in New York and Dr. Kreissig in Germany.

**You are invited now to listen to their conversation and read the transcript below.**

In this [excerpt](#), Drs. Lincoff and Kreissig describe their first meeting in 1969.



[Here](#) Dr. Lincoff begins by describing his first work on cryosurgical adhesions and Dr. Kreissig relates using an electron microscope to study the ultrastructure of a light, medium and heavy cryosurgical lesion resulting in different adhesive strengths.

Drs. Lincoff and Kreissig [conclude](#) with their insights into minimal retinal surgery.

[Click here](#) to listen to the complete audio of their conversation (54 MB)

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**HARVEY LINCOFF:** This is Professor Ingrid Kreissig from Germany and I'm Harvey Lincoff from New York. And we're both eye doctors, both retinal surgeons. Ingrid, would you share a little of your family history and any connections that it had to medicine and ophthalmology.

**INGRID KREISSIG:** Actually, there is no family history, neither in medicine nor ophthalmology. As a child, perhaps influenced by my governess, Else Zenz, who was formerly a nurse, I got interested in medicine and I was always determined to become a doctor. When I was a child and we had, for example, a whole chicken to be prepared for dinner, I would be very curious about its anatomy. However, we were living in the DDR and I was not a child of proletarians, so we were punished as capitalists. I had to leave high school and I would have never been able to study medicine, if my parents hadn't left and fled to West Germany.

Once in West Germany things were very problematic because we came with nothing. We had to get clothes for the winter from the church. I knew only Russian so I had to learn English, French and Latin quickly to cope with the different school system. I remember during these difficult times my father would say to us three children, 'To give is better than to receive. The things we left behind meant nothing. The only thing that counts in life is having knowledge and earning good diplomas because no one can take those away from you.' And this has guided my private and professional life since.

I worked very hard in school and soon was receiving scholarships. As I started to study medicine in Bonn, Germany I always took parallel courses in art and music. During my study of medicine, I found the practical course in anatomy to be difficult and I switched temporarily to physics, but I very quickly realized that medicine was what I really wanted. Then I got a one-year Fulbright Scholarship to study in the United States. I took the

opportunity to study music and art while in Cleveland, partly under the guidance of George Szell.

Once I returned to Germany, I went straight into medicine and subsequently studied at the University of Munich and Bonn. I took my residency in several locations in Europe. First I was attracted by dermatology, because it followed my interest in art. I liked to observe differences in the shades of colors and different shapes of the skin lesions, elements which form the basis for dermatological diagnosis. When at the end of training I was asked by my chairman to specialize in cosmetic surgery – since I liked surgery and apparently did it well - and to build up a department for it, I decided to give up dermatology and switched to ophthalmology to be involved in saving sight.

Dr. Lincoff, how did you decide upon retina for your field?

HARVEY: I got a Heed Fellowship to go to Boston to study neuro-ophthalmology with David Cogan. While there, I took Edward Norton's suggestion to meet up with the Schepens group, who were prospering in a new treatment for retinal detachment. There was great enthusiasm in the retina department, and I began to spend more time with them and so became fascinated with the problems of retina and, subsequently, entered it as a full-time occupation.

I acquired a binocular indirect ophthalmoscope developed by Charles Schepens and saw the retinal periphery as never before. I developed a retinal detachment service at the New York Hospital, which prospered with Edward Norton's help. My scope was only 1 of 3 in the city at the time. Our operation for detachment was then modeled on the Boston technique which was largely encircling with drainage.

In 1954 I was sent to Hans Karl Mueller in Bonn to evaluate their photocoagulation technique which had been developed by Gerd Meyer-Schwickerath. Before leaving New York, Edward Norton asked me to look in on Ernst Custodis in Duesseldorf who claimed he was not draining subretinal fluid. In Bonn I quickly appreciated the photocoagulator and bought one for New York. Then I went to Duesseldorf and saw Ernst Custodis localize a retinal break with monocular indirect ophthalmoscopy,

treat it with diathermy and compress a polyviol plombe with a single mattress suture over the break. He closed the eye without draining the subretinal fluid. The operation took little more than an hour. The next morning I examined the eye with my binocular ophthalmoscope and found the bullous detachment attached and the media clear. I stayed for a week to make sure that non-drainage worked on other cases and became convinced of the validity of the technique.

Professor Kreissig, what brought you into retinal detachment surgery?

INGRID: Once I switched to ophthalmology I specialized in the retina because I could implement my dermatological experiences, perceiving and differentiating colors and shapes, and I documented this by doing color drawings. The retina, indeed, became for me the “skin” of the eye. It was the optimum field in medicine for my acquired expertise.

My training in ophthalmology was done in Switzerland with a pupil of Hans Goldmann, named Alfred Bangerter. From him I learned to use the three-mirror - contact lens for microscopic examination of the retina. I received my surgical training through Rudolf Witmer and R. Kloeti in Zuerich. And then I applied for a position at Bonn University. In Bonn, Gerd Meyer-Schwickerath had left for Essen, where he became chairman of a department, and I got to work with Hans Karl Mueller. Mueller actually trained many future chairmen including Meyer-Schwickerath, Otto-Erich Lund in Munich, P. Niesel in Bern, and W. Leydecker in Wuerzburg. Mueller offered to continue my training, because I knew the three - mirror contact lens from Goldmann. And he said to me, ‘You have to do the detachment department, because you will be able to find the breaks in the detached retina.’ So Hans Karl Mueller was actually the first who alerted me that for detachment surgery, finding, locating and closing the retinal break is very important.

In Bonn, I learned monocular indirect ophthalmoscopy. That was the Meyer-Schwickerath School of thought. I learned cerclage with drainage, photocoagulation, diathermy and we did a form of cryo, but all of our procedures had many complications. Too many complications, it seemed to me.

And after that, I went to my chairman Robert Siebeck and I said, 'I think we are doing something wrong. I should see how others are doing detachment surgery and who are getting better results.' He arranged for me a one year Heinrich Hertz Scholarship to go to the United States to learn detachment surgery. The question was where to go. I went back to Switzerland, to my teachers, Kloeti and Witmer, and they said, 'Go to Harvey Lincoff in New York. It's a small department, but there you will learn a lot. And go to Charles Schepens in Boston and Edward Okun in St. Louis.' They were so kind, they wrote to Harvey Lincoff in New York to inform him when I would arrive.

But in 1969, when I arrived in New York there was no Lincoff in the office. He was on vacation. I asked myself: 'Should I go back? Should I give up New York?' I thought, having made all this effort to travel to New York I would wait for him- this master in retinal detachment surgery.

Dr. Lincoff, how was it when I came to your office?

HARVEY: Well, this slender blonde appeared in my office. And I was impressed by her appearance. And then I asked her, 'Have you ever done a retinal detachment?'

INGRID: Which I thought was outrageous, having done 200 detachment operations though not very successful. But I stayed.

HARVEY: I said, 'Why didn't you apply to Ernst Custodis,' who was closer to you in Germany, actually 40 miles North of Bonn?

INGRID: Yes, and I was perplexed. We, in Bonn, had repaired so many detachments using Meyer- Schwickerath's methods- we were his pupils. We did cerclage with drainage, as I said, photocoagulation...but, I had never heard the name 'Custodis.' So here, I was in New York and Dr. Lincoff tells me, 'you should be training with Custodis.' I looked at Dr. Lincoff's cases. I was convinced that I could learn from his experience, but I thought, 'I better see first what the others are doing.'

So I left New York. I went to Boston, to Schepens, and I went to St. Louis, to Okun. I found out that they were actually doing what we were doing in

Bonn— the cerclage with drainage, diathermy, gas injection, and, in St. Louis, they did photocoagulation. So I contacted my chairman in Bonn and I said, 'I think in New York there is something I should learn.' He gave permission and I came back to New York.

Perhaps I should describe what impressed me in what you did. I was impressed by the way you meticulously searched for the break, and how much time you spent preoperatively to solve the problem of a retinal detachment and to document it in a precise drawing, and to do surgery based on this drawing.

But, Dr. Lincoff, did you not have complications with the Custodis procedure?

HARVEY: Well, there was infrequent infection, which Charles Schepens reported, with a rare perforating scleral abscess beneath the polyviol plombe. We made an animal model of polyviol, infected with staphylococcus and discovered that the diathermy was the critical factor. If we eliminated diathermy, there might be superficial infection, but no scleral abscess. There began a search for an alternative to diathermy. And during a visit to my dermatologist, I saw him applying a carbon dioxide pencil to freeze a lesion which he said creates inflammation. And so I took the pencil back to my laboratory and applied it to the eyes of some rabbits and over the subsequent week observed a white lesion, looking very much like the results from diathermy. And when we examined it in the laboratory, we found that there was a pigmented chorioretinal adhesion where the freezing lesions had been. And we further examined it, and then I asked Ingrid to examine these lesions using electron microscopy, because I was thinking of substituting the freezing lesion for diathermy to eliminate the prospect of infection.

INGRID: Yes, in this way my experience in histology helped me; I had studied histology at the same time as dermatology. I was certain that we had to study the cryosurgical adhesions with the electron microscope, but where to get an electron microscope in 1969, in the New York hospital? We did not have access to any electron microscope.

HARVEY: Why wouldn't they just give us the electron microscope?

INGRID: There were difficulties --- and there weren't many around. There was maybe one around, but we couldn't get access. And so I thought we should find another solution, to be pragmatic. I went to various companies. I went to the Zeiss Company in New York, who had a very good electron microscope. I talked and conferenced with the director Rudolf Partsch and told him the project we were doing. And you wouldn't believe it, Mr. Partsch gave us permission to use the Zeiss microscope after hours. So we went every day...

HARVEY: This was the electron microscope they were selling on display.

INGRID: Yes, the demonstration model. In the evening we were given permission to work with the microscope to do our study on the cryosurgical adhesion. Altogether, I stayed three years to do this study. We did 336 rabbit eyes with various controlled lesions produced by light, medium and heavy cryopexy. We found out that different types of adhesions result from each type of cryopexy application: With the light cryopexy lesion, you would get an adhesion which is very light, but still quite strong to use, and it is made by interdigitation of the outer photoreceptor segments with the villi of pigment epithelium. A medium lesion, just a short whitening of the choroid, obtains a lesion of medium strength. It is made by desmosomal adhesions. It's a very strong adhesion. That's the adhesion we use in surgery. And then with the heavy lesion, resulting from a real whitening for one to two seconds of the retina, you get an adhesion, made by the infiltration of retinal tissue via Bruch's membrane into the choroid. It is the so-called chorioretinal adhesion. And this finally enabled us to determine that the cryosurgical adhesion is strong enough for retinal surgery, and it doesn't cause a necrosis to the sclera. Eventually it replaced diathermy in detachment surgery, wouldn't you say?

HARVEY: Oh, yes and that would eliminate scleral abscess, which resulted after the use of diathermy.

INGRID: So, Dr. Lincoff, you replaced diathermy with cryopexy to modify the Custodis procedure because you were convinced of the concept that non-drainage is great and that the correct surgical approach is to find the break and just close the break, and not to do a big buckle and to drain?

HARVEY: Yes, right.

INGRID: But later you replaced also the polyviol plombe. Why?

HARVEY: Oh, because Boston made a regrettable publication talking about infection as a result of the use of polyviol, which was actually quite good and didn't have any of the toxic qualities that Boston reported. Nevertheless, their report required us to do something about it and so I asked Dow Corning to build an elastic explant similar to polyviol out of silicone, which was then studied extensively and widely approved in surgery. They came up with the silicone sponge, initially an open-cell one and, subsequently a closed-cell sponge which resisted infection.

INGRID: Was there not a special remark Schepens made when you introduced the silicone sponge?

HARVEY: Oh, yes. Well, that was with the open-cell sponge. Charles Schepens said that it was like a New York apartment house and every room had bugs or staphylococcus in it.

INGRID: And how about the non-drainage procedure? I think you had many discussions with Schepens about it and he had made another special remark about it.

HARVEY: Oh, yes. Well, we had adopted the non-drainage procedure, and Schepens remarked that it was all right for doctors in New York to do it, because New York doctors never sleep.

INGRID: That's a very funny remark. You know, in meetings residents would say, 'I better drain, so that I can sleep.' And a resident of mine would say, 'Why don't you take a sleeping pill, instead?'

HARVEY: What would you say were the most important factors in the non-drainage operation?

INGRID: You mean for the success?

HARVEY: For the success of the non-drainage operation.



INGRID: I was first taught by H. K. Mueller and then trained by Harvey Lincoff to concentrate on finding the primary retinal break preoperatively. And you, Dr. Lincoff, provided the essential guidelines, the four Rules, to find the primary break in a retinal detachment. The most important thing with the non-drainage operation is to find the break, localize it correctly in the detached retina, because you will not be draining it intraoperatively, use cryopexy at its edges and then sew a small segmental silicone sponge just beneath the still detached break. We call this 'minimal segmental buckling without drainage or minimal extraocular surgery for retinal detachment.'

And since you do not drain, when you leave the table, the retina is not attached. And when you come out of the operating room and the relatives ask, 'How was the surgery?' You have to answer, 'I don't know. I think I did everything well. But we might know it tomorrow when the retina is attached.' You don't leave an operating room as a star. I mean, you are doubtful. And then the next day, if the retina has not attached spontaneously, the residents will say, 'Oh, my God. we didn't find the break or we overlooked a break, or we didn't buckle well.'

So it's not a very attractive procedure and you can understand why..... Because in 78% of the cases that don't work the surgeon did not find the break or did not buckle the break well. This detracts from the popularity of this minimally and nontraumatic extraocular surgery. But we surgeons are convinced we have to find the break, we have to close it, and not to do more. To be as minimally traumatic as possible, which is the best for the future function of the eye during long-term.

Now, I would like to ask you, Dr. Lincoff, the non-drainage procedure means that the retina is not attached during surgery and not directly after surgery- so what is so good about this procedure? I mean, why shouldn't we drain?

HARVEY: Well, Ingrid, first of all, we learned that if you place the buckle properly beneath the retinal break, it will become attached most of the time, around 90% of the time. And to avoid drainage, you're avoiding the most morbid procedure of the operation. Drainage risks hemorrhage as you go through the choroid, it decompresses the eye and causes choroidal

detachment, you can get incarceration of the retina and vitreous, perforation of the retina— countless complications come from perforating the eye for drainage. Eliminating drainage from the buckling procedure made the procedure a relatively benign one.

INGRID: That's very convincing.

HARVEY: Where does the concept of segmental buckling, that is with the silicone sponge, fit in with the existing operation of cerclage or encircling the eye?

INGRID: This is a very tricky question which I would have liked to pose to you. But I will answer. Cerclage was conceived to close off unseen holes in the very periphery of the retina. And I think that it was justified in the early time when we didn't have binocular ophthalmoscopy with depression or the three - mirror contact lens with depression of the retinal periphery. At one time I developed a special depressor to indent and make visible the periphery of the retina in presence of an inserted Gonio lens.

Once it became recognized that you have to treat the break, then it was realized that the cerclage would need an additional buckle beneath the break to tamponade it sufficiently. And you might say, 'Why did they still keep the cerclage?' They kept the cerclage for prophylactic reasons- as prophylaxis against an overlooked peripheral break or subsequent vitreous traction. That might not have been so bad a reason, however, Dr. Lincoff and I, we did studies on the morbidity of the cerclage and we found out that when you use the cerclage you get anterior and posterior ischemia. And then you might say, 'Well I just constrict a very small amount.' But we found that even if you constrict only 10%, you get problems like this. And what is most important, and this was recently discovered, when you constrict even 10%, you have a 43% decrease in pulsatile ocular blood flow. Lincoff, being a very good observer, found pigmentary changes and W. Winter found that there are changes in the visual field in the long-run.

Now, when you cut the cerclage, it is not needed to remove it, 85.6% of the pulsatile ocular blood flow returns and the retina and choroid will recover. And I think if you are using a cerclage, for whatever reason— because you learned it, or because you feel more secure or you think the eye does need it,

please don't constrict too much. Even 10% is already much. The moment the retinal findings are stable, you should cut it to save the eye's function and the ocular pulsatile blood flow will be, again, reaching almost normal levels. Before cutting the cerclage, you might check whether a break might need some additional laser around it. But in none of the eyes in which the cerclage was cut, a redetachment occurred. Of interest is that the indentation of the cerclage persisted after cutting it. This was due to scar tissue that had developed around it.

Now, Dr. Lincoff, I would ask you—you see with segmental buckling and non-drainage that we have a very low morbidity. We have less than 1% chance of buckle extrusion or infection and less than 1% diplopia, if you are very careful with the muscle, if you do not traumatize the perimysium. That is also if you do not use sharp instruments; if you just use anatomical forceps. But we still wanted to avoid these extraocular reversible complications. We were thinking to replace the silicone sponge, which we have to suture on, because making an intrascleral suture also harbors dangers—you can perforate. And we searched for seven years in various animal experiments to replace the sutured on sponge for something else. Would you like to say something about it?

HARVEY: Oh, well, we thought to replace the sponge buckle that you had to suture on the eye with the parabulbar insertion of a balloon on the end of a catheter underneath the conjunctiva and Tenon's capsule placing it beneath the detached break and expanding it. And then after a week or so, deflating it and removing it. That was a temporary balloon buckle and we had trouble getting them made. Initially, I made them in the operating room with a plastic tube and the little balloon that we acquired, but subsequently—I think you had one made.

INGRID: Yes, in Stuttgart nearby Tuebingen, by the Ruesch Company.

HARVEY: In Germany.

INGRID: It was difficult to get it well done. I think we tested at least 30 different variations until we had a balloon which didn't leak and which had a good connection between the balloon, the catheter and adapter. The Ruesch Company made a very suitable balloon and we used it. I did a study on 500

retinal detachments which were treated with a balloon. And balloons you can only use on a detachment with one break or with a group of breaks within one clock hour. The breaks can be superiorly located or inferiorly; in contrast to the gas operation, where you can only do superior breaks more or less. The balloon is for one week in the parabolbar space. We used the data from our animal experiments. We knew that after seven days the applied cryopexy lesion is strong enough and, after observing that there was enough pigmentation around the break, we deflated the balloon without any topical anesthesia. We withdrew the fluid from the balloon and the catheter jumped out by itself.

And now you would like to know the data- the results with this procedure. The results of this procedure, from a selected group of patients with detachments, were very good. After one balloon insertion in 500 detachments, the retina was reattached in 93% of patients, and after six months we found detached retinas in 2%. Then after one reoperation it was attached in 98% of cases. Only in four eyes out of 500, that means in 0.8%, there was a second reoperation needed and the retina was then reattached in 99% of the 500 detachments during a follow-up of 2 1/2 years.

The balloon operation was more difficult than segmental buckling without drainage because you had to localize the break on mobile conjunctiva, and you couldn't do it on sclera where the mark is fixed. At first in our department, you know when I was chairman in Tuebingen, the residents thought that this was an easy procedure to do and suddenly our results became terrible. So my practice became: you can do a balloon operation if you have done 50 non-drainage operations, learning how to localize a break which is still detached. And then the results with the parabolbar balloon were very good and favorable.

But we had to convince the other colleagues. So we did a multi-center, transatlantic and European study. In New York, there was participating Harvey Lincoff and his group with Stanley Chang and Jackson Coleman, Edward Okun – chairman in St. Louis- and W Friedman. And in Europe my pupils: Gisbert Richard who became chairman in Hamburg, Germany, Peter Kroll- chairman in Marburg, Germany, Ulrich Mester— head of department in Sulzbach, Germany, Nelly Sivkova— chairman in Plovdiv, Bulgaria, Krystina Pecold— chairman in Poznan, Poland, Susanne Binder— head of

department in Vienna, Austria, Vincenzo Ferrara— head of department in Arona, Italy, Z. Bissogiannis— Athens, Greece and Brigitte Witassek— Bern, Switzerland. And so we had very quickly a big group in this European transatlantic multicenter study.

We published the results already in 1983. Please, recall: We didn't have the Internet at that time. The published article was put together by going back and forth, communicating by visits, faxes, phone calls and mail. And we convinced people that they could do the same balloon operation.

HARVEY: Are there functional benefits, Dr. Kreissig, to using a segmental buckle to treat a retinal detachment?

INGRID: First of all, if you do not drain, as Professor Lincoff mentioned already, you don't have the complications of hemorrhage, incarceration of vitreous and retina, perforation of the retina or infection because you're doing an extraocular procedure. To convince people that a buckle did not need to be supported with the addition of cerclage and that it would provide good long-term results, I did a study of 107 detachments over a period of 15 years with a follow-up every three months for every patient. For two patients we even had to go as far as Paris and Morocco to get the follow-up. And this is what we found out after this minimal segmental buckling having been performed, this minimal extraocular surgery as we finally refined it and called it. The retina preoperatively had a visual acuity of 0.3. After six months, the retina had recovered a visual acuity of 0.5, and the visual acuity continues to increase up to one year after surgery to 0.6.

So far, so good, but the doubts and the question were always, 'Will this function remain? Will the retina stay attached long-term, because there is not the supporting prophylactic cerclage?' And during these 15 years, we got the following idea: because we had two eyes to study, we used the fellow eye as the control and the operated eye with a buckle as the eye we would follow-up. And we found out that over 15 years, in both eyes, the fellow eye and the operated eye with a local buckle in place, that there was a slight decrease of 0.07 lines on the Snellen chart per year. But, there was no statistically significant difference between the 2 eyes.

Why was this decrease happening? We looked up and found the data of Slataper, who had examined 17,349 normal individuals. And he had found out that after the age of 60 - our patients with retinal detachments were older than 60 most of the time- that over the age of 60 you had a decrease per year of 0.07 lines on the Snellen chart which was the same decrease as we observed in our operated eyes as compared with its fellow eye and this decrease was due to age. So the segmental buckle in place doesn't disturb or jeopardize regained visual function and it provides a long-term retinal attachment. And we could say, if you had buckled the break very well and the retina is attached, the risk of redetachment is greatest in the first six months postoperatively; the rate is 1% per month. But after this period, between six months and 15 years, the risk of redetachment is only less than 0.5% per year. So that means, if once the retina is attached and you didn't traumatize the eye and you didn't induce PVR (proliferative vitreoretinopathy), then you have regained visual acuity and the reattached retina for the long term.

Of interest in this context are the results of the multicenter European Study (SPR Study), initiated by the vitrectomists at the end of the 1990 comparing scleral buckling with primary vitrectomy as treatment for medium severe primary retinal detachments. The clinics doing minimal segmental buckling without drainage, as we in Tuebingen, Peter Kroll in Marburg, Gisbert Richard in Hamburg, Vincenzo Ferrara in Arona/Italy, etc. were not included in this study. But after I was no longer chairman in Tuebingen at the end of the year 2000 and my successor was a vitrectomist, some cases from Tuebingen were added to this SPR study.

To our surprise, the results for scleral buckling- though not done by minimal segmental bucklers- were favorable for phakic eyes. In phakic eyes the functional results after scleral buckling were statistically significant better than after vitrectomy; in pseudophakic eyes the results were not statistically different, but only better after vitrectomy when it was combined with a cerclage. However, after reoperations the results were comparable after both techniques.

Now in view of our present financial situation and considering socioeconomic aspects, scleral buckling, done by minimal segmental buckling without drainage, is less expensive, a less morbid procedure harbouring less secondary complications jeopardizing vision and requiring

treatment. Therefore, let's wait, and consider the vast spectrum of new expensive treatment options now available for various macular diseases.

HARVEY: Dr. Kreissig, are there preoperative conditions that will influence postoperative visual acuity?

INGRID: Yes, you know, we were concerned about the postoperative visual acuity. We were worried, 'What might influence postoperative visual acuity?' Is it only the surgery which we tried to make minimal, or are there other factors which are determining the postoperative visual acuity? And I was always saying 'reattachment is one thing and visual acuity is something else.'

And, here, forgive me, I would like to report a little episode I experienced with a patient. I came back from Dr. Lincoff having learned segmental buckling without drainage. We had a medical conference. I presented this patient. Of course, it was a reattached retina and it was a so-called successful surgery. However, to tell you the truth, you never should say 'successful surgery' in the presence of your patient. Everybody looked into the eye and thought it was great and said, 'Your retina looks fine.' After the meeting, I saw a distressed patient, and he said to me, 'Doctor, everybody says my retina looks fine, however I don't see very well. I cannot read!' I got perplexed. The retina was attached, why did the patient complain? And that was the postoperative function which was not good. I was then very much concerned with how we could influence it. After that experience with the patient, I questioned every patient about the quality of his or her regained visual function. From 1976 to 1978, I did a close follow-up on 266 retinal detachments that we had operated with segmental buckling without drainage, i.e. with minimal extraocular surgery. We were testing preoperative and postoperative quality and quantity of visual function, published in 1977 and 1981.

Now, concerning postoperative visual acuity, what's important here, is the extent and the height of the macular detachment and the duration of the macular detachment. If a macula was detached less than one week, the visual recovery was much better, even better if it was detached only two or three days. If we compare the regained visual acuity of someone whose detachment lasted less than one week with someone whose detachment

lasted one to two weeks, there was a statistically significant difference in the visual acuity of the patient postoperatively. However, if we compared the postoperative visual acuity of a patient with a two week retinal detachment with a patient whose detachment lasted one year, there was no statistically significant difference. That means, you have to operate very quickly, very early, if possible, the first days.

And now you might say, 'My patient is in Australia and he wants to come to me.' Then it is very good to use a method Dr. Lincoff and I described recently, ambulatory binocular occlusion. We found that by using this method, the retina might get flatter and the detachment doesn't progress. If a macula is detached, it gets flatter. And even if a macula is not yet detached, the macula will not detach under ambulatory binocular occlusion. That means, your patient can go on a plane with double patching and go to the surgeon wherever he would like to be treated.

HARVEY: Lifting up the patch occasionally...

INGRID: Yes, when the patient goes down staircases or when he eats a sandwich. So the duration of the macular detachment was important. The age of the patient- if a patient was less than 60 years old- the recovery was better. And the fourth point which was important was myopia. If myopia is less than 6 diopters, the visual recover is better.

And now concerning the postoperative color vision, if the patient is under 60, color vision recovers better. Color vision recovers more slowly than visual acuity. After three months, only 1 in 2 patients were found to have normal color vision and only those under the age of 60. A color vision deficiency was always present in a patient whose visual acuity was less than 20/100. However, when your visual acuity was more than 20/30, there was no color vision deficiency present.

That's very reassuring, but you will now hear about metamorphopsia, the next thing which could influence visual acuity. Metamorphopsia is the most sensitive indicator of whatever has happened previously to a patient's macula.

HARVEY: That is slight distortion...



INGRID: Yes, a slight distortion of lines in the Amsler grid. Metamorphopsia is always present after a macular reattachment, no matter how long the retina was detached or how high it was detached, how old the patient was, how young the patient was- metamorphopsia was always present whenever a macula was reattached, even after a year postoperatively, it was present. And what is most important, even if a patient had regained full vision, 20/20, and normal color vision, he would have metamorphopsia. And I'm always saying, 'Use the Amsler grid and you will see the scar of a preceding macular detachment.' You will find the remaining metamorphopsia in the Amsler grid. And even if the macula was only partially detached, you will see a partial area in the Amsler grid which shows metamorphopsia. So metamorphopsia is the most sensitive indicator for whatever has happened to a macula.

HARVEY: Of a former macular detachment.

INGRID: Yes.

HARVEY: Understood.

INGRID: Yes, I will ask you, Harvey. Why did you think that intraocular gases, given up since Beng Rosengren, would have, again, a limited place in detachment surgery around 1974?

HARVEY: Well, the local buckling operation is limited. In regard to posterior break, it's hard to put a local buckle very posterior. And for giant tears that's too large a buckle. And, therefore, an intraocular gas probably was appropriate for both of these situations. And I continue to use intraocular gas for posterior tears and large breaks.

Ingrid, did you not earlier apply gases without drainage and how much could you inject?

INGRID: Yes, that is a good question. I'm very grateful that you asked this. From 1974 to 1978, I treated problematic detachments with intraocular gas injection, SF<sub>6</sub>, as Harvey Lincoff and Edward Norton had introduced. But I had to drain again. Now, finally, I was convinced not to drain-

because not draining is a better option in detachment surgery. I wanted somehow to use the gases for these complicated retinal detachments and not to drain. So prior to injection I used ocular massage to decrease the intraocular pressure and then I injected SF6 with an expansion coefficient of 1.9.

You asked me how much I could inject? 0.4 milliliter of SF6 which had an additional expansion coefficient of 1.9. And this operation for problematic detachments, actually for too posterior holes and giant tears, I called 'expanding - gas operation.' I treated 15 problematic detachments and in 1979 I reported this expanding - gas operation without drainage at the Meeting of the German Ophthalmological Society (Deutsche Ophthalmologische Gesellschaft [DOG]). This was published in 1979. However, six years later, in 1985, Hilton introduced this gas technique without drainage, but he did not read or did not know the German literature, he called it 'pneumatic retinopexy.' His technique became widely used for uncomplicated detachments.

I might mention that at a Club Jules Gonin meeting someone asked Hilton, 'Why did you not call it expanding - gas operation, as Kreissig published six years earlier?' He said for his defense, 'I don't speak German and I didn't read the German literature.' Nowadays, we publish in English and that is much easier.

But we did not apply the expanding - gas operation for uncomplicated detachments as subsequently pneumatic retinopexy was used for. For uncomplicated detachments, we used, as I mentioned before, the balloon operation which we had available since 1979. That means, six years earlier than Hilton introduced pneumatic retinopexy. To use a temporary buckle outside of the eye has, of course, less morbidity than an intraocular gas bubble in the eye, which causes PVR in a much higher percentage and new breaks, therefore, we favor the balloon operation, which was technically not so easy to do. As I mentioned, it is a procedure where you must find the break and you must be an expert in binocular indirect ophthalmoscopy.

Now, Dr. Lincoff, I would like to ask you why did you pursue the application of intraocular gases beyond SF6? Why was SF6 not enough?

HARVEY: Well, after giving the gases some thought, we concluded that SF<sub>6</sub> was a relatively simple gas, but in the carbon gases—CF<sub>4</sub>, C<sub>2</sub>F<sub>6</sub>, C<sub>3</sub>F<sub>8</sub>—were opportunities to expand the properties of gases. Perfluorocarbon gases were not toxic, had larger expansions and a longer intraocular duration to avoid the need for re-injections. CF<sub>4</sub> was equivalent to SF<sub>6</sub>, it expanded 1.9 times and had a half-life of 6 days. C<sub>2</sub>F<sub>6</sub> had an expansion of three times and had a half-life of 10 to 12 days. And C<sub>3</sub>F<sub>8</sub> expanded four times and lasted 35 days. So that widely expanded the potential for the gas operation for various retinal problems.

Today, the operation is still in use and has become a part of almost all vitrectomy procedures.

Dr. Kreissig, how did your teaching courses in the various countries come about?

INGRID: This has a long story. It started in 1977 in Bonn where I was in charge of the retinal detachment department and was continued in Tuebingen where I was Chairman from 1979 to 2000. Actually I was the first woman chairman in Germany who had a surgical chair in ophthalmology. Over the years I had trained many residents from foreign countries, in particular from Eastern Europe, Saudi Arabia, America and North Africa. Some came on a scholarship or grant and they stayed anywhere from several months to five years as it takes five years in Germany to earn an ophthalmology degree. So I had a very good and close relationship with these smart, young doctors from foreign countries. And I actually wanted to keep them, but I thought for the future it is better if I sent these well-educated doctors back to their countries to implement their training in their surroundings and in their way of living. I trained over 300 foreign doctors and I sent everybody back. I regretted this very often and many doctors wanted to stay. So I said to them, 'I promise you, you will come back. We will keep in contact. I will integrate you into the teaching here and there and you can come back to our courses.' Sometimes when we invited them back to Tuebingen, they had problems coming, in particular the doctors from Eastern Europe or Russia. Then I would put an ad in the newspaper that said, 'please contact me, if you would be willing to take an Eastern European doctor for several weeks and provide breakfast and room for free.' Even the Mayor of Tuebingen took three doctors, so we had this problem solved. I had many doctors coming

and maintained good relationships with them so I knew what they were doing. In the future many became heads of departments or chairmen.

With the continued personal contact with my former trainees from the East, I also wanted to favor Transeuropean scientific and clinical exchange with increasing personal relationship.

So eventually when I did the teaching courses, it worked out very well; I had my friends working with me again. I put the friends I trained from Europe and America on my teaching faculty. When I went to foreign countries to teach, the teaching courses in the various countries were always locally organized by my former co-workers. So the teaching courses abroad were organized by colleagues who knew what I wanted to have for a teaching course. In addition, we had a good teaching faculty consisting of colleagues from Europe: Italy, England, Germany; America and some from Eastern Europe.

It might be of interest that when I became emeritus in 2000, these former pupils established a Kreissig Foundation at the University in Tuebingen/Germany. This is providing funds for an annual Kreissig Award given at the European Retina Meeting (EURETINA). The Award is given to specialists who are experts in posterior segment diagnostics or posterior segment surgery.

And now I'm doing more teaching courses than ever, because I think teaching is now, for me, more important than doing surgery. The young generation should do the surgery, and I come back to what I said in the beginning: I received so much from excellent teachers that I now feel that I have to transfer my teaching and knowledge to the next generation and I do this with these teaching courses. For instance, next year, I have already planned eight teaching courses. The teaching courses are of one or two days. I have a teaching course next year in Sudan, the Emirates, two in Russia, Japan, Italy, Kazakhstan and Thailand.

For these teaching courses, I used to make scripts so that everybody knew what we were hoping to teach and the teaching course had a continuous concept. Finally, I thought why all these various scripts? So I wrote three textbooks for the teaching courses, which present all the concepts in these

teaching courses and all the slides, so when we are there, the participants have something pocket-sized to read. Subsequently, my pupils translated these books and now they are available in English, Japanese, Chinese, Russian, Italian, Spanish and now it's about to be translated into French. So when we go to teach courses, I can hand the book, e.g., in Russian, to the interpreter who's a simultaneous translator from English into Russian. This makes it easier for everyone and we can really discuss with each other.

HARVEY: Do you still only concentrate on retinal detachment or have you not developed an increasing interest in macular and retinal vascular disease?

INGRID: As I was mentioning, after becoming emeritus in 2000, I thought teaching would be my primary thing and the surgery, I thought, should be done by the young colleagues. And I have tried to transfer my knowledge with videos and teaching. In 2001, I went to Mannheim-Heidelberg University where the youngest German chairman is Jost Jonas. He was among the first who injected intravitreal triamcinolone. I entered his group and we published a lot about intravitreal triamcinolone for various vascular diseases of the retina and the macula, and then we integrated in our spectrum, of course, Anti-VEGF (Vascular Endothelial Growth Factor) and we did PDT (Photodynamic Therapy) and, of course, various diagnostics and OCT (Optical Coherence Tomography).

And so I'm now concentrating more on medical retina. In my teaching courses I integrate medical retina and diabetes, which is very prominent in African countries where obesity and hypertension are a big problem. But I really try in these teaching courses to come back to this, to transfer the concept of doing the minimum of surgery for repair of a retinal detachment: to find the break, to limit the buckle and the coagulation to the break, not to drain and that by this the retina will spontaneously attach. And this minimal extraocular surgery is really my project. I want to transfer it to other generations that with doing less you are ending up getting more for the eye and the patient in long term.

HARVEY: How do you deal with initial failure after a segmental buckle, Ingrid?

INGRID: Yes, that is something.... you know, when you do this minimal extraocular surgery for a primary detachment, it's already difficult to convince someone that you don't have to do prophylactic surgery, that you just have to concentrate on the little break. If you have a flat tire when you ride a bicycle, you don't always buy a new tire. You just find the little hole. That takes time, it is an art. And I think minimal segmental buckling is also an art: you have to learn it and you have to be convinced of it. But if there is now a failure, people are saying, 'Ah-ha! Now we can do major surgery'—either gas injection, silicone oil with vitrectomy, or a cerclage.' I learned from you, Dr. Lincoff, that a retinal detachment can be solved by an analytic rational approach, and you can even approach a reoperation like this. Lincoff and I, we analyzed 752 retinal detachments and their 87 failures. We operated on these retinal detachments with segmental buckling without drainage, and to our surprise we found that 45% of failures were due to an overlooked break. And, believe me, we were looking for breaks. And 31% were due to a break which was not buckled correctly. So if you put this together, in 76% or in 8 of 10 failures, you have overlooked the break or you have not buckled the break sufficiently. So the approach would not be to then do major intraocular surgery or a major extraocular surgery. The treatment, the logical treatment, is not to induce too much trauma, not to induce PVR. The logical treatment for a reoperation with convex contours would be to then find the break and buckle it sufficiently.

Here is the rationale: The retina reacts in a rational and predictable way to the position of the break. And it's the same in a reoperation. In a reoperation, the contour of the detachment, the change of the contour or the absence of change of the contour tells you where you have to look for the break and for this we established four Rules. These four Rules of reoperation are on the back cover of my second book, *A Practical Guide to Minimal Surgery for Retinal Detachment. Vol. 2* which covers temporary tapenades with balloon and gases, comparison of techniques, reoperation, case presentations. And on the back cover of the first book, *A Practical Guide to Minimal Surgery for Retinal Detachment: Vol. 1* which covers diagnostics and segmental buckling without drainage and case presentations, we have the four Rules to find the primary break, defined by Harvey Lincoff and Richard Gieser in 1972. The 4 Rules for reoperation, Lincoff and I, had defined in 1996.

I would like to ask you, Dr. Lincoff, which teachers have influenced your professional life?

HARVEY: Oh, well, Charles Schepens, whose masterful approach to retinal detachment encouraged me to pursue this area in ophthalmology.

INGRID: Custodis also?

HARVEY: Yes, I think Ernst Custodis had a specific technique which appealed to me. And I must say I adopted the Custodis technique after being trained by Schepens.

INGRID: And how about the Gonio lens?

HARVEY: The Gonio lens you described to me.

INGRID: Oh, yes. You taught me binocular indirect ophthalmoscopy. And I was privileged to introduce you to the three - mirror contact lens, because I came to you after I had been trained in Switzerland

HARVEY: That's true. What teachers influenced you, Ingrid?

INGRID: Yes, I have to go back very far.

First of all I have to mention my father as I described already earlier. Then Alfred Bangerter in Switzerland, where I was trained in Gonio lens diagnostics. He was a very meticulous, obsessive, and excellent surgeon. Rudolf Witmer and R. Kloeti taught me how to be a friend to residents and to have a very collegial atmosphere in the department ---- and how to work with them.

Another person who influenced me greatly was H. K. Mueller, who taught me to look for the break in a retinal detachment. And when we had rounds, Mueller would not accept on Monday a visual field from Friday. He would say, 'I would like a visual field from Sunday or from today.' He would ask many details about the patient. We were almost frightened. When he asked me so many details of a patient, apparently he saw that I really felt uncomfortable. He said to me, 'Doctor, I don't want to punish you. I only want to know everything so that we don't make a mistake with a patient, that

we don't overlook something.' And this sentence I kept in my mind when I did rounds as a chairman. Certainly, I asked very critical things so as not to overlook something, to do the best for the patient.

And, also, I got influenced by Jackson Coleman. He was a very knowledgeable and a very generous chairman. He made me adjunct professor at Cornell University, New York Hospital.

And Larry Yannuzzi, being an expert in Medical Retina, he was very generous in sharing his knowledge and providing slides without asking me to refer to him when presenting his knowledge. He really enjoyed distributing and transferring his knowledge to others.

But the person who influenced and guided me the most is Harvey, who sits across from me. I was impressed by his devotion to the patient and by the joy he had in doing his work. I was impressed by his analytic and critical approach to retinal detachment. And he studied the eye so long, until he understood the rationale. And I did the same. I was obsessive, meticulous, when I had retinal detachments in Tuebingen. I had to find a logical solution for repair. And he was, in addition, a good doctor, not only a good ophthalmologist. When a patient, had to have general anesthesia - and this was an exception - , he would take the stethoscope and he would listen to make certain that the tracheal tube was in the trachea and not in the esophagus.

So all these concepts: of devotion to the patient and to be happy to distribute your knowledge to others, I got from the various teachers I have known and learned from. All this I try to transfer now to the next generation of doctors when I do my teaching courses in the various countries, not only in Tuebingen where I was, but in the various countries. So I'm very grateful for everything I have learned and, in particular, to Dr. Lincoff.

HARVEY: What were the biggest challenges that you faced in ophthalmology?

INGRID: The biggest challenge for me was to switch from cerclage and drainage to segmental buckling without drainage. And, since after an extensive preoperative study, I got good results, to transfer these positive



results to other colleagues who wanted to do more extensive surgery for security.

HARVEY: And what surgery?

INGRID: Major surgery. And important in our concept of surgery is to invest the most time in preoperative study to do afterwards a very short surgery.

HARVEY: Minimum surgery.

INGRID: Minimal surgery.

HARVEY: Which is what segmental buckling is.

INGRID: Segmental buckling without drainage is minimal surgery, and the optimal minimal surgery is the balloon, because you don't have to do any suture and you remove the buckle, just by withdrawing the fluid from the balloon catheter.

HARVEY: Or the segmental buckle.

INGRID: It's the next step, that's right, without drainage.

I would like to ask you, what are the important questions that are still in our field of detachment surgery? What is still open in detachment surgery to be done? We have the large buckle. We have the small buckle. We have the gases. We have the vitrectomy

HARVEY: Well, the non-drainage procedure greatly improved it. Eliminating drainage of a retinal detachment diminished most of the complications of the operation and made the operation relatively benign.

INGRID: So what is the most important conclusion after 40 years of surgery? On my side, I would say that prior to surgery, you should think about what not to do and you should not think about what to do in addition, as a kind of prophylaxis. You have to think about and to arrive at the smallest and least morbid procedure to solve a retinal problem. And this is a

conclusion after 40 years of retinal detachment surgery. As a beginner, I always asked myself, 'What could I add to succeed, to be more successful?' And, therefore, I did much too much. This additional surgery was done for my own security, actually, or you might say, as a prophylaxis. But the more years I have done surgery, the more I have reduced the quantity of my surgery in one surgical intervention. I have done less surgery to achieve a maximum result with a minimum of complication.

And as it was true in art, where I started before I did fulltime medicine and this proves to be true, as well, in retinal detachment surgery. Less surgery is more for reattachment and for long-term visual function, and it is more for the patient. Most patients are elderly patients and this minimal surgery can be done with local anesthesia. And I think that is what I would like to transfer to the next generation: minimal extraocular surgery.