

EXCERPT: Oral History of Robert Machemer, MD

Interviewed by W. Banks Anderson, Jr. MD, July 2009



DR. W. BANKS ANDERSON, JR.: I'm Dr. W. Banks Anderson, Jr. speaking this morning with Dr. Robert Machemer in Durham, North Carolina. And, Robert, I can remember years ago, when as an ophthalmologist at Duke, I learned of your work in Miami and sent a patient to you. He had a blind eye from what in those days we called massive vitreous retraction. And this was the term that applied to retinas that were not only detached but pleated into folds and held that way by fibrous bands. I had been telling such patients for years before that their eye was irretrievably blind and there was nothing anyone could do about it. To him, however, I was able to say, 'There's this guy down in Miami who's figured out a way to restore vision to some eyes like yours and if I

were you, I'd go see him.' And he went down to Miami and he came back with his retina attached.

And to begin, when and why did you start messing around with the vitreous?

DR. ROBERT MACHEMER: I think it was the environment that stimulated me. Miami was full of people that were willing to discuss, trying to accept new things, challenge you when you came up with something. And in this atmosphere, Dave Kasner had done something that we all thought was unheard of. He had purposefully removed the vitreous in eyes that were for cataract surgery.

DR. ANDERSON: So you had learned it wasn't really necessary to have a vitreous?

DR. MACHEMER: That's what he concluded. He said, 'I am not panicking anymore when the residents lose vitreous. I know you can remove it. Actually, you have to remove it. You will get better results.' And we were aghast. And we

were more aghast when he, one day, reported about a patient of his where he had used what was called open sky technique, cutting the eye open by a...

DR. ANDERSON: That was something Charles Schepens had tried?

DR. MACHEMER: No.

DR. ANDERSON: Similar to something that Charles Schepens had reported?

DR. MACHEMER: Yes, but not at that time. Dave had done that on his own. He made a very large opening anteriorly had to remove the lens and then went down to remove the vitreous. In his case, it was an amyloidosis. And, lo and behold, the patient could see again. And nobody would believe it, despite the fact that the patient could see. It was there. I was very stimulated by that and thought one might be able to use finer instruments than what he used, just to prove the technique. And I started with an open sky approach on rabbits that I had injected with the blood into the vitreous.

DR. ANDERSON: Now in my day retina surgeons seldom used the binocular microscope. But it was current with some surgeons, not all the surgeons. But you had to use the binocular microscope for this didn't you?

DR. MACHEMER: No.

DR. ANDERSON: You didn't?

DR. MACHEMER: I started right away with the microscope, microsurgical approach.

DR. ANDERSON: So you did use the microscope from the start?

Ed. note: Dr. Machemer here was confusing the term binocular "microscope" with that of the binocular indirect "ophthalmoscope".

DR. MACHEMER: Yes, right from the start, and not via the binocular microscope, which I thought made it more complicated because I didn't have my hands free. I had to hold the lens to see. Anyway, we did removal of blood in the vitreous of rabbits via open sky approach. That worked. Then we did it on humans. And I remember very clearly.

DR. ANDERSON: So the first patients you did were bloody vitreous patients?

DR. MACHEMER: It was a diabetic patient, who had five years of opacity, non-improving, and everybody said, 'There is nothing one can do.'...hand movement vision. The vitreous was taken out and he could see again.

DR. ANDERSON: Now, did you use the open sky technique for that?

DR. MACHEMER: Not... yes, that was my... sorry. You want to know about...?

DR. ANDERSON: The open sky to start with?

DR. MACHEMER: Yes, that was the procedure that was known from Dave Kasner, and I had now a small instrument that would remove the vitreous, not anymore two instruments. And we tried that on a patient who had a cataract and a vitreous hemorrhage. So the cataract surgeon removed the cataract, but through an anterior opening taking away the cornea, and then I had access to the vitreous cavity, used this instrument and that worked very well. And that was the first open sky technique approach to vitreous surgery.

DR. ANDERSON: And that was the size of the pupil or half the size of the pupil...that instrument?

DR. MACHEMER: Oh, smaller. That was I think 2.1 millimeter.

DR. ANDERSON: And Jean Marie Parel had helped develop this instrument?

DR. MACHEMER: No, not this instrument, because Jean Marie was still in Australia. And in desperation to get going, we had put together the prototype vitreous surgery instrument made from the airplane drill and the syringe with a tube attached to it.

DR. ANDERSON: With the drill cutting against the side of the tube?

DR. MACHEMER: Yes.

DR. ANDERSON: And that was a bloody vitreous case?

DR. MACHEMER: Yes.

DR. ANDERSON: When did you attack the retina?

DR. MACHEMER: Not immediately following this open sky approach. We then had tested the possibility to go through the pars plana. When you look at an eye, there is a place to get into the eye. The only question is, is there enough space? So using eye bank eyes, I tested how much a vitrectomy instrument could remove of the vitreous by not touching yet the lens and moving then through the available space close to the wall of the eye. And that was amazing how much vitreous could be removed. In addition, vitreous comes to you as you apply suction. And so we thought, 'Let's do the next case with a pars plana approach. And...

DR. ANDERSON: Was that a bloody vitreous case?

DR. MACHEMER: That was a diabetic with five years' history of hemorrhage that didn't clear and a slight cataract. And the vitrectomy was done. And to our surprise, it worked beautifully. He could see before the operation hand movement and after the operation 20/60 or something like that. And a lot was due to the cataract of that patient. This meant the principle works. Now, it comes to refinement. And being under Ed Norton, and Ed Norton being a generous man, he said, 'I have so many cases that I can't do because of the limitations of the surgical techniques. You have some experience with the air techniques that I've worked with. Can we not work together and do, for example, a giant tear?' And I...

DR. ANDERSON: Giant tear is a giant tear of the retina?

DR. MACHEMER: Of the retina, very large, larger than 180-degrees. The others he could handle. And I had, meanwhile, developed in animal experiments, in monkeys, the technique of filling the eye with air, and thus pushing the whole retina back to the wall of the eye and giving it time to adhere to the treated choroid, and luck wanted it that we were successful with the first case. A first case successful does everything, because the barrier is gone.

DR. ANDERSON: I'm sure that pleased Ed.

DR. MACHEMER: Oh, it did. And he was very impressed, and he made sure that the work could be reported at the Academy. Now, you know how long it takes to submit a paper to the Academy and how early you have to be to get into the program. Well, this was, let's say, May, and the Academy was in early fall. He got me on the program. And this is Ed Norton, you know, generously, letting his

faculty members do things without putting himself into the foreground. And I'm very, very grateful to having had a chief who was that way.

This was like a bombshell. And people came to me afterwards and said, 'Oh, I have an instrument like you have.' For example, Nicholas Douvas. He had developed that instrument for removal of the lens as an alternative approach from the front. And, obviously, as we know now, there were difficulties with that. So he was delighted to hear that his instrument might be useful after slight modification for the vitreous, and it was. And later, we heard that Schepens had an instrument also similar to the vitrectomy instrument. He even patented it, but never used. No publication had come out of it, and not used for vitreous surgery. It was intended for cataract surgery. What I want to say is this was in the air. I remember getting a letter from a soldier in Vietnam who proposed a little propeller to liquefy vitreous to remove it. So ophthalmology, in a way, was ready to take on a problem that they still couldn't tackle. And I was lucky to be there at that time and to be stimulated by the faculty in Miami.

DR. ANDERSON: Now, your colleagues then on the retina service started using the vitrector. Is that correct?

DR. MACHEMER: Slowly. Remember, each instrument was very delicate, had to be tested, you know, by me first whether it would work, whether it would cut and so on, and so there was a training period. Well, how do you train people? People wanted courses. The first course was not in the United States. It was in Germany, and at the eye clinic in Essen, under Meyer-Schwickerath.

DR. ANDERSON: Meyer Schwickerath I think was famous for the development of the photocoagulator. And was it true that he lost a macula as a result of his work?

MACHEMER: Yes, he looked into the light he created with a Xenon bulb.

DR. ANDERSON: So he hosted you?

DR. MACHEMER: Yes, he invited me to organize a course and I looked at it as a thank you for my German training and was very surprised that although the leaders of ophthalmology were invited to this course, nothing was done later in Germany on that technique. It ultimately lagged two to three years behind the United States, except for one person. That's Kloti.

DR. ANDERSON: Who was that?

DR. MACHEMER: Rudolph Kloti, an ophthalmologist in Switzerland, who developed his own instruments. And, naturally, they were courses in the United States. The demand was high. They exerted all kinds of pressure on Ed Norton and me to get into that course, you know, various people, because they saw this as a technique that can produce.

DR. ANDERSON: How many instruments or folks could you have for that first course?

DR. MACHEMER: Well, you would not want to have a course too large where great details have to be taught. Now, you have to have the microscopes to do the surgery inside the eye. And how many microscopes can you get? Well, Zeiss had to help. How many are they willing to provide? Fifteen or so, you know. For them, something that they hadn't done before, you know, to that degree.

DR. ANDERSON: Well since for the first time retina surgeons were using microscopes it was probably good for them.

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