Chapter 3
How we got to do ultra high-speed filming of the vocal folds more than five decades ago
Hans von Leden

Abstract

In this chapter, Hans discusses with Amy M. Matson the path that led him and Paul Moore to utilize the ultra high-speed camera to study the laryngeal actions.

How we got to do the high speed filming of the vocal folds (VF)?

Well, Amy, here is how it happened. As long as I practiced laryngology, I was truly flabbergasted by my inability to visualize the motions of the VF in the many professional singers and non-singers that came to my office seeking advice and/or treatment for their dysphonia. I really felt like an inadequate ENT doctor. Then, one day, I remembered that when serving in the US Navy during WWII, I saw the military use ultra-high-speed cameras (UHSC) to study explosions. What an idea, I thought, and I started to look for an UHSC with a hope that it could be used to study VF. I was lucky.

First, an UHSC was available at the Northwestern University (NU) in Chicago, the place where I then worked, though it was hidden in a basement lab. Then, I discovered the existence of Dr. Paul Moore, a NU professor and on top of this, a PhD voice scientist and voice pathologist. Paul was not only willing to participate, but was also eager to figure out how to rig a contraption that would be capable to film the motions of the VF and capture both image and the sound. Thirdly, the Medical School at NU agreed to sponsor this project and some of the well-to-do and generous patients of mine donated necessary funds to get this going.

As soon as the equipment was ready and tested we began to film for real. We used both B/W film and color film as well. With color filming the speed was slower and the speed was faster with B/W film (this restriction prevails until today even with HSDI). So, we started with 2000 frames per second. Once recorded, we played the films back at normal speed, and this gave us an idea to use a slow motion display. We were in VF heaven. What we saw exceeded our expectations and allowed us to present completely new ideas on how voice is produced.

Let me brag a bit about our work, and how what we decided to combine to be presented in three consecutive documentary films gave us international recognition. Our first film entitled “The Function of the Normal Larynx” won the First Prize at the 1957 Venice Scientific Film Festival. Northwestern was mighty surprised, and we were as well, perhaps even more so. But wait, the saga does not stop there. Later we won similar awards at the International Science film festivals in Milano (Italy), Vancouver (Canada), Padova (Italy) and in San Francisco (USA). The prizes were for the two consecutive films, one entitled “The Function of the Larynx under Daily Stress” and for the other film entitled “The Function of the Pathologic Larynx.”
Of course, we were very excited to receive these awards and recognitions, but we were even more pleased to learn that our films were used in instructions about the VF for many years to come by more than 120 institutions of higher learning in the USA and the world.

In 1959, Paul gave up his research on this subject when he became a Chairman of the Department of Speech Pathology at the University of Florida at Gainesville. At that time I moved to LA, where I continued my laryngeal research I established already in Chicago. I continued and enlarged this research during the next 15 years (1959 to 1975). There is however, also an unpleasant closure to our effort. When we moved the lab in LA from one to larger location, all equipment and 100,000 feet of exposed film were lost. We were never lucky enough to reconstruct this marvelous contraption and the data.

So, now more than one half century later, UHSC is replaced by HSDP, a commercially produced equipment. What a luxury and what a thrill to have this technology out of the work bench and ready to be used clinically as well.

Evidence of the importance of this HSDP technology is documented in this publication, and I truly hope by many more in the future. The work of the researchers and clinicians contained in this publication clearly document that HSDP is here to stay. I am truly fascinated by the gains in knowledge about human voice production in health, disease and in artistic training that HSDP is facilitating.

I wish all of you plenty of good luck, and God Bless you all.

Figure 1. Italian Minerva Award given to Hans von Leden and Paul Moore at the Venice Scientific Film Festival (1957) for the film “The Function of the Normal Larynx.” Photo by J. Izdebski.

Figure 2. Award for participation in the 3rd International Exhibition of Special Cinematography (Rome, Italy, 1957). Photo by J. Izdebski.
Figure 3. Award for participation at the IX International Exhibition of Short Documentary Films (Venice, Italy, 1958), given to Hans von Leden and Paul Moore for the film “The Larynx and the Voice.” Photo by J. Izdebski.

Figure 4. Amy M. Matson with Hans von Leden at his house in Los Angeles, CA.