

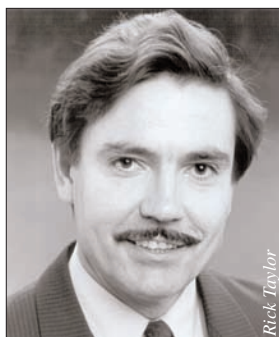
Circulation

JOURNAL OF THE AMERICAN HEART ASSOCIATION

European Perspectives in Cardiology



In Search of Andreas Roland Grüntzig, MD (1939-1985)



Thirty Years Ago, in 1977, Dr Andreas Grüntzig Performed the First Coronary Angioplasty With the Balloon Catheter He Had Invented. This Special Anniversary Article is Dedicated to This Extraordinary Cardiologist.

After his initial success, Dr Grüntzig's life changed, and he championed live demonstration courses to teach the safe use of the new procedure. A book, *Journey into the Heart*, by science writer David Monagan, chronicles his life, work, and untimely death in a plane crash. Robert Short, BSc, summarises the life of this remarkable pioneer, largely on the basis of this biography but also with the invaluable help of Dr Grüntzig's first wife, Michaela Grüntzig, and his coworker, Maria Schlumpf.

Although *Journey into the Heart*¹ by science writer David Monagan does discuss a number of heart pioneers, it really amounts to a biography of Dr Andreas Grüntzig, inventor of the first balloon catheter for coronary angioplasty, and an account of the industry that mushroomed from his work. Mr Monagan conducted more than 100 interviews in the United States, Switzerland, and Germany. He portrays his interviewees (many of them cardiology pioneers in their own right) both as they are now and as they were during Dr Grüntzig's lifetime. He harvests and sifts their words to produce a rich, frank, dramatic portrait of Dr Grüntzig and his impact on those he worked with, treated, trained, and loved.

The book aims to entertain and inform a wide non-specialist readership, and so it is technically simplistic. An article in *Circulation* by Dr Grüntzig's friend Spencer B. King III, MD,² provides a more scientific, well-illustrated, concise, and medically orientated account of Dr Grüntzig's life and work. Dr King practises at the Andreas Grüntzig Cardiovascular Center, Emory University Hospital, Atlanta, Ga. The Web site angioplasty.org³ has short video clips featuring Dr Grüntzig and discussing his contributions.

A Child of the Rubble

Andreas Grüntzig was a war baby, born in 1939 in Dresden, Germany. His father, Wilmar Grüntzig, PhD, taught science, but the Luftwaffe weather unit drafted him, and he probably died during the final defense of Berlin. His body was never found, and, as Mr Monagan implies, "years passed" with Charlotta, Dr Grüntzig's mother, making trips to the train station hoping to meet her husband there.

Andreas and his brother were "children of the rubble" after the war. Charlotta, a teacher, struggled to support her sons by clerical work and piano instruction. The family emigrated to Argentina, where they spent 2 tense years before Charlotta's homesickness and, perhaps, a prewar zest for the cultural past of Leipzig brought her back to the communist-ruled German Democratic Republic. However, Andreas's teenage intelligence, languages, and other interests shone too brightly for the East German social engineers—they saw the fruit of class privilege gleaming from his high academic achievement at his school, the Thomas-Gymnasium. The East German regime had an official policy of placing children of working class parents in the universities, and sons and

On other pages...

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daughters of academics into manual work. So, like his elder brother, Johannes, Andreas would not receive the opportunity to attend a university. The authorities decided that the life's work of the future king of coronary angioplasty should be trowelling cement for concrete block walls. In 1957, at the age of 18, the young Andreas decided to follow his brother, already in Heidelberg by this time, and cross to the West—something easy to do at that time; he simply had to go to Berlin, take the city train to the Western sector of the city, and not return. So many talented young people did this that in 1961 the German Democratic Republic decided to build the infamous Berlin Wall to stop this exodus. When Andreas arrived in the West, the German Federal Republic welcomed him, as they did all the young people in his situation, and provided him with a scholarship.

Interestingly, Dr Grüntzig's widow, Michaela Grüntzig, Psychologin Lic. Phil. I, points out that the German Democratic Republic did not acknowledge its history as a consequence of the Third Reich and the Hitler years, whereas West Germany (the German Federal Republic) did so, making allowances for its citizens accordingly. This meant that, had Andreas' mother also come to the West, she would have received a survivorship annuity for herself and her 2 sons, whereas in the German Democratic Republic she had to work to sustain her family. Mrs Grüntzig stayed in Leipzig with her mother and elder sister, and only after retiring at the age of 65 could she have official permission to leave the East. To do this, she had to renounce her pension. She moved to Heidelberg, where Andreas lived at the time, and the German Federal Republic began paying her a survivorship annuity because her husband had died as a soldier in the war.

After receiving his scholarship, Andreas began his medical studies at Heidelberg University. There, he showed the hunger and drive for work that characterised many refugees from the stifling East German regime. He graduated in 1964. In 1969 Andreas and his fiancée, Michaela Seebrunner, went to Zurich to take up posts at the University Hospital there. Michaela was a psychologist counselling the staff, and Dr Grüntzig proclaimed to his new boss, chief of angiology Alfred Bollinger, MD, "I have dedicated my life to vascular disease."

The Kitchen Laboratory

In 1971, Dr Grüntzig visited the Aggertal Clinic in Engelskirchen, Germany, to watch Eberhart Zeitler, MD, use telescoping dilating catheters to reestablish blood flow in the legs of patients. These were developed by Charles Dotter, MD, a vascular radiologist at the University of Oregon in Portland, Ore. Dr Grüntzig and his host discussed Dr Dotter's controversial work and catheter design in general, including the possibility of a soft balloon tip.

Dr Grüntzig, back now in a café on Zurich's Gessnerallee, talked to Maria Schlumpf. Maria was originally the personal research assistant of Dr Bollinger, but for Dr Grüntzig she



Figure 1. Maria Schlumpf often found herself working at the Grüntzig's kitchen table, which was laid out with red wine and a range of materials, epoxy glue, and tools to help build catheters, often until late into the night.

was, in the words of Mr Monagan, his "muse". He particularly shared his raw visions with her. Maria would eventually provide proof and critique of his work by documenting the angioplasties he performed in Zurich over the years. It sounds quaint today, but Dr Grüntzig insisted that Maria Schlumpf was "balloon angioplasty's handmaiden."

In the café on the Gessnerallee, Dr Grüntzig talked to Maria of catheters and sketched out on a mat his ideas for a balloon tip that would take the Dotter technique into the heart. Some time later, in 1972, Maria went to his rented apartment expecting a glass of wine with Dr Grüntzig and his wife. Instead, he led her to a kitchen table laid out with a range of materials, epoxy glue, and tools for her to help him build catheters (Figure 1). It is an interesting coincidence that Dr Grüntzig's rented apartment was in a house owned by the mother of Thomas Lüscher, MD, FRCP, *Circulation's* European editor, now professor of cardiology at Zurich University Hospital.

These cheerful wine and Emmental cheese-fuelled evenings in the kitchen laboratory, with catheters pegged drying on a line, would dominate the free time of Maria, her

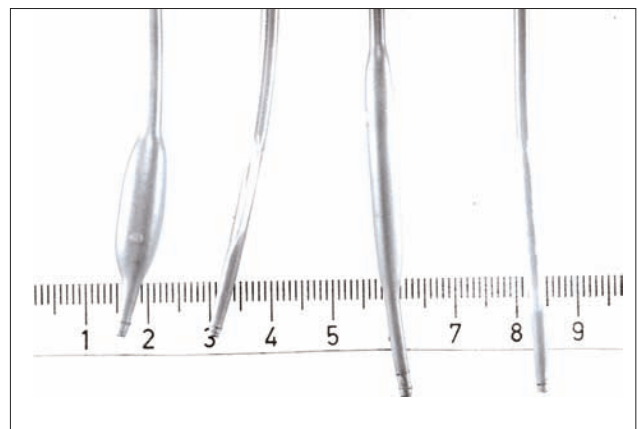


Figure 2. A selection of handmade iliac and femoral catheters from 1974. Dr Grüntzig used such devices for more than a year.

husband Walter, Michaela, and Andreas for several years. He drove on others as he drove himself, and he was persuasive, charming, and fun to be with. In one eureka moment with polyvinyl chloride, Grüntzig phoned Maria at 3:00 AM, demanding that she come over. "I must build a catheter right now," he insisted, because he felt he had the solution to creating the perfect balloon shape. And when expert engineering was needed to enable production of the double lumen, the engineer involved, Helmuth Schmid, worked enthusiastically at night, sometimes on the kitchen table, free of charge, to fulfil Dr Grüntzig's latest specifications. Mr Schmid worked for Hugo Schneider, who owned a company that made radiological needles.

Mr Schmid played a decisive role in the development of the double lumen catheter. For more than a year, Dr Grüntzig performed angioplasties on the leg using catheters with only one lumen (Figure 2), but he knew that to carry out a truly satisfactory procedure, he would need a catheter with a second lumen. The companies that Dr Grüntzig contacted to help solve this problem refused to assist him because they saw no profit in it. Mr Schmid succeeded in this task in his free time, without compensation. His employer did not appreciate this involvement of his employee, and in the end Mr Schmid had to quit his job.

The Wizard of Coronary Angioplasty

In 1976, Dr Grüntzig presented the results of his animal and his first human balloon angioplasties on leg arteries at the American Heart Association annual scientific sessions, telling the audience that he would soon take his method into the human heart. Most of those listening, including Dr King, were sceptical. However, Richard K. Myler, MD, who in the early 1980s would found the San Francisco Heart Institute at Seton Medical Center, Daly City, Calif, decided to go immediately to Zurich to see Dr Grüntzig at work (Figure 3).

On September 16, 1977, Dr Grüntzig performed the first coronary angioplasty on a live human. The patient, Adolph Bachman, a 38-year-old man suffering from angina and a

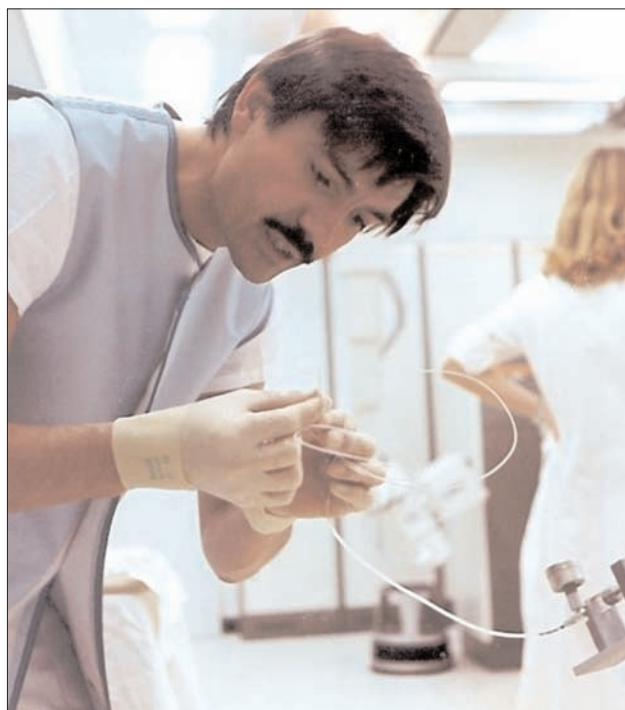


Figure 3. Dr Grüntzig checking a catheter in his Zurich laboratory.

single-vessel stenosis, remained conscious throughout the procedure. Dr Grüntzig had done 3 more procedures by the next American Heart Association meeting. Dr Myler reported to Mr. Monagan that, in the middle of Dr Grüntzig's delivery, "there was sudden applause. I'd never heard that in the middle of a presentation before." And afterwards, Mason Sones, MD, the heart pioneer who first combined cardiac catheterisation, angiography, and high-speed x-ray motion pictures in a single procedure, came to Dr Myler, crying, embracing him, and saying, "It's a dream come true!"

David O. Williams, of the department of cardiology, Rhode Island Hospital, Brown University, Providence, RI, and the medical editor of Mr Monagan's book, was one of the many cardiologists inspired to visit Zurich. He noticed something else remarkable about Dr Grüntzig: his skill in tweaking x-ray machines. He told Mr. Monagan, "No one else really understood as well as he did what a good image of a coronary artery lesion should look like, and there is no doubt that all of diagnostic angiography progressed a quantum leap thanks to his work."

Although doctors came to Zurich to see Dr Grüntzig's dramatic and eloquent live case presentations (Figure 4), the authorities in Switzerland failed to encourage his work, and institutions in Germany would not employ him. In contrast, America wanted him with a passion. In 1980, Dr Grüntzig went to Emory University Hospital, Atlanta, Ga. A few months later, he held his first American courses with live demonstrations. To an audience of some 200 doctors during several days, he proved himself a remarkably inspirational teacher, a courageously honest, self-critical

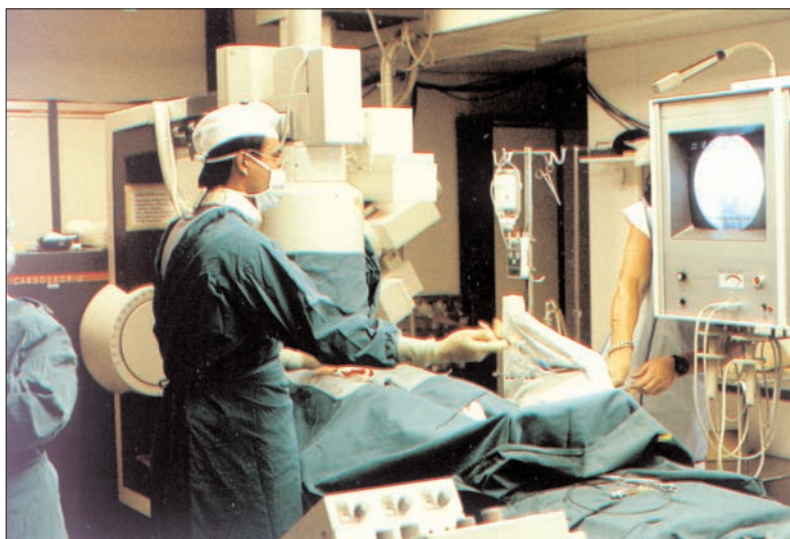


Figure 4. Dr Grüntzig performing a percutaneous transluminal coronary angioplasty in the University Hospital, Zurich, in 1979.



Figure 5. *Were you there? The assembled audience who attended Dr Grüntzig's fourth angioplasty course in Zurich in 1980.*

scientist, and a caring clinician. From this base and Dr Grüntzig's presentations (Figure 5), the technique rapidly spread into more general use. But that proliferation meant that he now had political and scientific battles to fight to prevent misuse or inappropriate application in complex coronary disease that might discredit his procedure. He demanded from others considering balloon angioplasty what he insisted on from himself—scientific rigor, the presence of rescue surgeons on standby, careful patient selection, and long-term follow-up. And angioplasty faced many problems that required scientific definition, such as the rates of restenosis. Heart surgeons also resisted fiercely, with much of their work melting away as diagnostic cardiologists became interventional cardiologists.

The Spoils of Success

Dr Grüntzig had great success, and not just financial; he tended to play as hard as he worked, and some considered him better looking and more dashing than should be allowed in a married man. Gail King, the wife of Dr Spencer King, told Mr Monagan, "Some women just threw their clothes off at the sight of him." A friend of Michaela's, she told Andreas to "cool it," but he told her that he made his own rules. He clearly thrived on fast living. He imported a Porsche that he sometimes drove at very high speed. He was also a keen light aircraft pilot and had his own aeroplane (Figure 6).

Whereas Dr Grüntzig acted like the master of the universe, Michaela did not thrive on the move to America. She disliked the frantic social life, and not working in the German language may have undermined her professional confidence. Eventually, in 1981, when a medical student, Margaret Anne Thornton began taking her place in her husband's life, Michaela returned to Zurich with her daughter Sonja, leaving Dr Grüntzig to his life in America.

Margaret Anne Thornton, married Andreas Grüntzig in 1983. Sonja visited for long holidays, and she apparently believed, at least briefly, that in 1985 she would begin living with her father and his new wife full time.

Mr Monagan chronicles different views of Dr Grüntzig's state of mind in the last years of his life. He faced pressure personally and professionally. At work, he seemed suspicious of his peers, although he remained very close to his staff and as remarkably attentive to his patients as ever. Despite his gregarious nature, full of the party spirit and *fête*d

everywhere, he did not let many people become close to him. He confided his loneliness tearfully on one occasion, but then he treated the confidant as if the event had never happened. He and his wife drank and partied, and though reports conflict as to their happiness, many photographs depict a happy relationship. His daughter Sonja, whom everyone agreed he loved sincerely, had a good relationship with her father and stepmother. Maria Schlumpf believed that his heart still lay in Zurich with Michaela, whereas Margaret Anne's parents were sure he loved their daughter and that they never had known such a happy couple. Gail King thought that he loved both of them and that he felt torn between the 2 of them.

The life of this extraordinary pioneer ended tragically on October 27, 1985, when Dr Grüntzig crashed his plane, with Margaret Anne on board. The final verdict on the cause of the crash was pilot error. His brother, Johannes, whom Mr Monagan attempted to interview, remained so suspicious that the plane had been sabotaged that he would not agree to an interview in 2003 unless the book became a reinvestigation of the circumstances of his brother's death.

Maria Schlumpf, when asked for her comments during the preparation of this article, said that Dr Grüntzig found in her a coworker who always had an open mind to his ideas and who was thrilled and enthused by the perspectives his ideas and plans opened to her. She says, "Through him, my work changed from routine to the challenge of research. I was capable and willing to follow his pace. I supported him and his work from the beginning, and we spent many hours of our free time studying. It began with the Achilles tendon reflex, then moved on to angioplasty."

Maria says that she detests being called "Dr Grüntzig's muse" and "balloon angioplasty's handmaiden." Nevertheless, she was a close and loyal friend to Andreas and Michaela Grüntzig, and she was dedicated to balloon angioplasty. She stayed in contact with him when he lived in Atlanta, and after his death she continued her follow-up work with the Zurich patients. To date, she has kept everything about Dr Grüntzig and the early times of angioplasty, including the table mats with his drafts, photographs, scientific papers, and the first catheters. Although these remain safe in her custody, anyone who wants to know or write about Dr Grüntzig and this chapter of medical history can depend on these materials, her knowledge, and her willingness to share them. Today, Maria serves as research coordinator in the clinical research unit of the University Hospital in Zürich and remains dedicated to Dr Grüntzig and his work.

"You Know, I Am a Psychologist"

Two things are missing from this biography. First, Dr Grüntzig's daughter, Sonja, does not seem to have been interviewed. In her mid 20s at the time of Mr Monagan's interviews, and an actress who may have inherited her father's flare for attracting attention, she could have shared with the book's readers her perception of her father, memories of her family life moving between the United States and Switzerland, and reflections on the gifts that she feels she



Figure 6. Dr Grüntzig gained a taste for fast living, and learnt to fly his own aircraft, an achievement that was to lead to his premature death in a plane crash in 1985.

has had from him. The picture of him will remain incomplete until we hear what she has to say.

There is a second omission. In a book full of heart experts giving their views on the state of Dr Grüntzig's mind, the one person who, at this distance from the pain of events, has the professional qualifications to look over his life and to speculate on the way he engaged with the individuals whom he befriended and supported and with the groups he taught, was his wife. She was not reinterviewed about this quote:

"You know, I am a psychologist," Michaela offered. "I have reached a certain time of life when I am returning to think about things from the past. My view is that he always tended to put himself in the middle and to gather people around him in order to liven things up somehow. But I now think this must have been a way of handling the life that he developed. As a child he gave life to his mother and enjoyed the attention. But he didn't really let people get that close to him... There weren't many close friends."

So, 2 or 3 years before the publication of the book, his first wife Michaela approached the threshold of articulating a coherent insight into Dr Grüntzig, based on her knowledge of his relationship with his mother and the part he played in

providing her with moral support, perhaps in East Germany, in this fatherless family. Dr Grüntzig might well have transferred his boyhood strategies for "giving life" to his mother and gaining her attention to his adult engagements with individuals and groups. Michaela has, in fact, communicated with *Circulation: European Perspectives in Cardiology* after reviewing this article; she comments, "These strategies may well also have been an attempt on the part of my former husband to compensate his mother for all the losses and hardships and frustrated expectations of her own life."

Until we have the full story, the search for Dr Andreas Roland Grüntzig will go on.

Robert Short is a medical journalist

The assistance of Michaela Grüntzig and Maria Schlumpf in checking the accuracy of the facts of this article and adding previously unpublished comments and information is gratefully acknowledged. All the photographs, except the portrait of Dr Grüntzig on page f41, were provided by Maria Schlumpf.

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A Special Meeting

September 16, 2007, will mark the 30th anniversary of Dr Andreas Grüntzig's successful completion of the first angioplasty. A special anniversary meeting, "Thirty Years of Angioplasty," will take place in Zurich, Switzerland, on September 15 to 16, at the University Hospital, Zurich. Many of the people involved in Dr Grüntzig's life will contribute to the meeting, including some mentioned in this article. The meeting is organised by the International Andreas Grüntzig Society. For full details of the programme, visit www.scai.org/pdf/IAGS_30yr2007.pdf, or contact Ruth Amstein, PhD, at ruth.amstein@active.ch, or Esther Willi at esther.willi@usz.ch.

Meeting Report: The Sixth Interventional Workshop

A European Workshop on Interventional Paediatric Cardiology Was Held Recently in San Donato Milanese, Milan, Italy

Gianfranco Butera, MD, PhD, FCSAI, a paediatric interventional cardiologist, reports on the sixth instalment of the oldest international workshop on interventional paediatric and congenital cardiology.



The most recent International Workshop on Interventional Paediatric Cardiology took place on March 28 to 31, 2007, in San Donato Milanese, Milan, Italy. It drew more than 550 participants, from more than 30 countries worldwide, with participants from Europe, the United

States, South America, Australia, Asia, and Africa. The workshop attracted not only paediatric and adult cardiologists from all over the world, but also junior doctors, fellows, nurses, and technicians. The cardiac surgeons, anaesthesiologists, paediatricians, neonatologists, and neurologists

who also attended the event gave the workshop an enthusiastic, interdisciplinary character.

More than 50 lectures went on during the workshop, by a faculty of 45 leaders in the field from Europe, Canada, and the United States. During the first day, doctors, nurses, and x-ray technicians attended 3 separate workshops: a workshop for physicians, a workshop for nurses, and a workshop for x-ray technicians, each aimed at offering a selection of topics discussed from the point of view of the participants' special area of expertise.

Consistent with the didactic style of the first day, an interventional procedure-simulator system, the *AGA Sim-Suite*, represented a major technical attraction, introduced for the first time in Europe by the workshop. Installed just outside the main auditorium, it allowed attendees to practice the most common interventional procedures. All attending fellows had to spend at least half an hour practicing throughout the 4 days, assisted by proctors and a professional staff.

On the second day, the workshop began its core activity, with live cases and scientific sessions. Scientific sessions (Figure 1) mainly focused on fetal and neonatal interventions, hybrid procedures, stents, and ventricular septal defect closure, and a number of world-renowned interventionalists made speeches and live case demonstrations. During the third day, attendees had the opportunity to learn about news, tips, and useful tricks for the closure of atrial septal defects, patent foramen ovale, and ductus arteriosus, with the help of a group of opinion leaders in these fields.

On the last day of the workshop, the sessions covered the exciting field of transcatheter treatment of pulmonary, mitral, and aortic valve diseases, again with leading specialists addressing the delegates.

The presentation of live cases (Figure 2) represents a special feature of this workshop. Attendees generally agreed that they had found the 22 live cases performed throughout the meeting extremely interesting, because of the pathologies, procedures, and devices used, and because of the operators' technical performance and abilities at demonstration. Many Italian and European centres participated. The San Donato Hospital presented 14 cases, with additional live cases transmitted from Naples and Genoa,



Figure 1. Faculty members at a scientific session: a number of world-renowned interventionalists made presentations.



Figure 2. Dr John Carminati and Dr Butera presenting a live case, 1 of 22 performed at the meeting.

Italy (2 cases each centre), Budapest, Hungary (2 cases), and Berlin, Germany (2 cases).

Apart from the clinical aspects of the meeting, the attendees also enjoyed a gala dinner; 5 buses took more than 550 delegates from the congress venue in San Donato to the wonderful historic Villa San Carlo Borromeo, located in Senago, not far from the centre of Milan. First built more than 7 centuries ago by the Visconti family, it has hosted many famous people over the centuries, including Leonardo da Vinci, Pope St Charles Borromeo, Ippolito Pindemonte, Denis Diderot, Stendhal, Alessandro Manzoni, Benedetto Croce, Giovanni Verga, Luigi Pirandello, and, more recently, Eugène Ionesco and Jorge Luis Borges.

All lectures and some selected live cases performed during the workshop will soon appear, free of charge and in their entirety, online at the workshop's Web Site, www.workshopIPC.com. By looking at these pages, trainees, those interested in the field, nurses, and even experienced paediatric and adult cardiologists will have the opportunity to see up-to-date, state-of-the-art demonstrations of the interventional techniques used in congenital heart disease, from the fetus to the adult survivor.

The first and second workshops on interventional paediatric cardiology took place in 1996 and 1998 in Massa, near Florence, Italy, but in 2001 the meeting moved to San Donato Milanese, where it has occurred every 2 years since. The next workshop will take place from March 25 to 28, 2009.

Dr Butera is a consultant in paediatric and interventional cardiology at the Pediatric Cardiology and Grown-ups with Congenital Heart Disease unit, Policlinico San Donato IRCCS, San Donato Milanese, Milan, Italy. He may be contacted at gianfrancobutera@libero.it.

The opinions expressed in *Circulation: European Perspectives in Cardiology* are not necessarily those of the editors or of the American Heart Association.

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